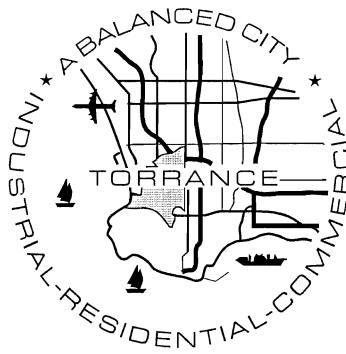


**PROJECT MANUAL FOR 555 MAPLE AVENUE  
RECREATIONAL SPORTS FIELD  
B 2013-40**



**AUGUST 2013**

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**PART A**  
**NOTICE INVITING BIDS**

**CITY OF TORRANCE  
CALIFORNIA**

**NOTICE INVITING BIDS**

Notice is hereby given that sealed proposals for performing the following described work will be received at the office of the City Clerk of the City of Torrance, California, until **2:00 p.m. on Thursday, September 19, 2013** after which time they will be publicly opened and read at 2:15 p.m. in the Council Chambers of said City:

**Bid for 555 Maple Avenue Recreational Sports Field  
B2013-40**

Plans, Bid Proposal (for reference only) and Specifications are available for viewing and printing from the City's website at <http://www.torranceca.gov/25079.htm>.

**There will be a mandatory pre-bid conference held on Tuesday, September 3rd at 10:00 a.m. commencing at 555 Maple Avenue, Torrance, CA 90503.** The City of Torrance will consider the bidder as non-responsive if the bidder does not attend the mandatory pre-bid conference. **Addenda will be issued only by email and only to those attended the mandatory pre-bid conference.** All addenda must be acknowledged. Failure to acknowledge addenda on the bid forms provided may render the proposal non-responsive and cause it to be rejected.

An official bid proposal packet, which includes: bid proposal forms, and a bound Specifications booklet may be obtained at the Office of the City Clerk (310) 618-2870, \$35 if picked up at City Hall, or payment of \$45 if requested by mail. Both amounts include tax. Neither amount is refundable. A prospective bidder must provide to the City Clerk's office, the firm's name, address, telephone and fax number, a contact person and a valid email address.

If requesting any item(s) by mail, please send check to the following:

**CITY OF TORRANCE  
OFFICE OF THE CITY CLERK  
3031 TORRANCE BLVD  
TORRANCE, CA 90503-2970  
ATTN: B2013-40**

The project estimate is between 1 million to 1.5 million dollars. The work shall be completed within ninety (90) calendar days of receipt of the Notice to Proceed (NTP). Bidder must complete field preparation within first sixty (60) days of the project timeline to allow for installation of synthetic turf within the last thirty (30) calendar days. The ninety (90) calendar day schedule includes: completion of contractual paperwork, submittal review and onsite work. Bids are required for the entire work described herein.

The City has determined the bidder must have a valid "A" Engineering License **and** D-12 Synthetic Product Contractor License. Bidder must have completed a total of nine (9) full size soccer (120 x 75 yds) or football field (120 x 53.33 yds) using synthetic turf within the last three (3) years. References must reflect this experience.

Per Division 2, Chapter 2 of the Torrance Municipal Code, the Torrance City Council may reject any and all bids, waive any informality or irregularity in such bids, and determine the lowest responsible bidder.

No Facsimile Bids shall be accepted by the City.

Project is subject to state prevailing wage rates.

By order of the City Council of the City of Torrance, California.

For further information, please contact Diane Megerdichian, Business Manager General Services Department at 310-781-7151 or [dmegerdichian@torranceca.gov](mailto:dmegerdichian@torranceca.gov). If emailing questions, please put project title in the subject line.

**PART B**  
**INSTRUCTIONS TO BIDDERS**

**CITY OF TORRANCE  
CALIFORNIA**

**INSTRUCTIONS TO BIDDERS**

**A. QUALIFICATION OF BIDDERS**

**1. Competency of Bidders**

The Bidder shall be thoroughly competent and capable of satisfactorily performing the Work covered by the Bid. As specified in the Bid Documents, the Bidder shall furnish statements of previous experience on similar work. When requested, the Bidder shall also furnish a plan of procedure proposed; organization, machinery, plant and other equipment available for the Work; evidence of financial condition and resources; and any other documentation as may be required by the City to determine if the Bidder is responsible.

**2. Contractor's License**

At the time of submitting the Bid, the Bidder shall be licensed as a contractor in accordance with the provisions of Chapter 9, Division 3, of the California Business and Professions Code. The required prime contractor license class for the Work is shown in the project Notice Inviting Bids. However, the City reserves the right to award the Contract to a contractor with another class if the City determines that the license is proper for the work.

**B. BIDDER RESPONSIBILITY**

A responsible Bidder is a Bidder who has demonstrated the attribute of trustworthiness, as well as ability, fitness, capacity and experience to satisfactorily perform the work.

Bidders are notified that, in accordance with Division 2, Chapter 2 of the Torrance Municipal Code, the City Council may determine whether the Bidder is responsible based on a review of the Bidder's performance on other contracts.

If, based on the provision and criteria in Division 2, Chapter 2 of the Torrance Municipal Code, the General Services Director proposes not to recommend the award of contract to the apparent low bidder, the Director shall notify the Bidder in writing of its intention to recommend to the City Council that the Council award the contract to the next lowest responsible bidder. If the Bidder presents evidence in rebuttal to the recommendation, the Director shall evaluate the merits of such evidence, and based on that evaluation, make a recommendation to the City Council.

C. ADDENDA TO THE CONTRACT DOCUMENTS

The City reserves the right to revise or amend these specifications prior to the date set for opening bids. Revisions and amendments, if any, will be announced by an addendum to this bid. If the revisions require additional time to enable Bidders to respond, the City may postpone the opening date accordingly. In such case, the addendum will include an announcement of the new opening date.

All addenda must be attached to the bid. Failure to attach any addendum may render the bid non-responsive and cause it to be rejected.

D. PREPARATION OF THE BID

1. Examination of Site, Plans and Specifications

Bidders shall examine the site of the work and acquaint themselves with all conditions affecting the work. By submitting a bid, the bidder shall be held to have personally examined the site and the drawings, to have carefully read the specifications, and to have satisfied itself as to its ability to meet all the difficulties attending the execution of the proposed contract before the delivery of this proposal, and agrees that if awarded the contract, will make no claim against the City based on ignorance or misunderstanding of the plans, specifications, site conditions and/or contract provisions.

The Contractor shall have included in the contract price a sufficient sum to cover all items, including labor, materials, tools, equipment and incidentals, that are implied or required for the complete improvements as contemplated by the drawings, specifications, and other contract documents.

2. Bid Instructions and Submissions

The Bid shall be submitted on the Bid Proposal forms included in the Specifications. All Bid Documents must be completed, executed and submitted with Bid by Bidder. Required seven (7) Bid Proposal Documents:

1. Bidder's Proposal
2. Addenda Acknowledgment
3. Contractor's Affidavit
4. Bid Bond (10% of Bid)
5. List of Subcontractors
6. References (1 pages)
7. Bidder's Information (2 pages)

All prices submitted will be considered as including any and all sales or use taxes. In case of a discrepancy between a unit bid price and total bid, the unit price shall prevail.

E. BID FORM/BOND

The Bid must be accompanied by cash, a certified or cashier's check, or a surety bond (bid bond) payable to the City of Torrance. Bids must be submitted on the proposal forms furnished by the City Clerk's office. The Bid Guaranty shall be in an amount equivalent to at least 10% of the Total Contract Bid Price.

Within ten (10) days after the award of the contract, the City Clerk will return the proposal guarantees accompanying those proposals, which are not to be considered in making the award. All other proposal guarantees will be held until the contract has been finally executed, after which they will be returned to the respective bidders whose proposals they accompany.

F. AFFIDAVIT

An affidavit form is enclosed. It must be completed signifying that the bid is genuine and not collusive or made in the interest or on behalf of any person not named in the bid, that the bid has not directly or indirectly induced or solicited any other Bidder to put in a sham bid or any other person, firm, or corporation to refrain from bidding, and that the Bidder has not in any manner sought by collusion to secure for itself an advantage over any other Bidder. Any bid submitted without an affidavit or in violation of this requirement will be rejected.

G. NONRESPONSIVE BIDS AND BID REJECTION

1. A Bid in which any one (1) of the required seven (7) Bid proposal documents are not completed, executed and submitted may be considered non-responsive and be rejected.
2. A Bid in which the Contract Unit Prices are unbalanced, which is incomplete or which shows alteration of form or irregularities of any kind, or which contains any additions or conditional or alternate Bids that are not called for, may be considered non-responsive and be rejected.

H. AWARD OF CONTRACT

In accordance with Division 2, Chapter 2 of the Torrance Municipal Code, the City Council reserves the right to reject any and all bids received, to take all bids under advisement for a period not-to-exceed sixty (60) days after date of opening thereof, to waive any informality or irregularity in the Bid, and to be the sole judge of the merits of material included in the respective bids received. This bid does not commit the City to award a contract or to pay any cost incurred in the preparation of a bid. All responses to this bid become the property of the City of Torrance.

I. NOTICE OF INTENT TO AWARD

Approximately two (2) weeks prior to the anticipated City Council meeting awarding a contract as a result of the RFP or bid, results will be posted on the City of Torrance Web site [www.Torranceca.gov](http://www.Torranceca.gov) and may be found by clicking on the following:

- Government
- Current Bids and RFPs
- View evaluated results of Bids and RFPs tentatively scheduled for recommendation of award to the City Council here.

J. BID PROTEST PROCEDURES

Please refer to City of Torrance website link below to obtain the City's Protest Procedures. [http://www.torranceca.gov/PDF/Bid\\_RFP\\_Protest\\_Procedures.pdf](http://www.torranceca.gov/PDF/Bid_RFP_Protest_Procedures.pdf)

K. EXECUTION OF CONTRACT

After the Contract is awarded, the awarded bidder shall execute the following six (6) documents:

1. Performance Bond (100% of Bid)
2. Labor and Material Bond (100% of Bid)
3. Contract – Public Works Agreement
4. Verification of Insurance Coverage (Certificates and Endorsements)
5. Business License Application Form

The contract shall be signed by the successful bidder and returned, together with the contract bonds and evidence of required insurance coverage, **within ten (10) working days**, not including Sundays, after the bidder has received notice that the contract has been awarded. Failure to execute the contract as specified above shall be just cause for annulment of the award and forfeiture of the proposal guarantee. The Contract shall not be considered binding upon the CITY until executed by the authorized CITY officials.

Bond amounts shall be as provided in Section 2-4 of the Standard Specifications for Public Works Construction. The Performance Bond shall be required to remain in effect for one (1) year following the date specified in the City's Notice of Completion, or, if no Notice of Completion is recorded for one (1) year following the date of final acceptance by the City Manager.

L. PERMITS, LICENSES AND CONTRACT SERVICES AGREEMENT

The Contractor shall procure and execute all permits, licenses, pay all charges and fees, and give all notices necessary and incidental to completion of Work. The Contractor shall execute a Contract Services Agreement. No fee is charged for a permits issued by the City of Torrance Building and Safety Department for a public works project. The Contractor shall obtain a City of Torrance Business License. To obtain a Torrance Business License please call 310-618-5923.

M. INSURANCE

The Contractor shall maintain Automobile Liability, General Liability and Workers' Compensation Insurance as specified in the Public Works Agreement included in the Project Specifications.

N. SUBCONTRACTS

Each Bidder shall comply with the Chapter of the Public Contract Code including sections 4100 through 4113. The Contractor shall perform, with its own organization, Contract work amounting to at least 50 percent of the Contract price. When a portion of an item is subcontracted, the value of the work subcontracted will be based on the estimated percentage of the Contract Unit Price, determined from information submitted by the Contractor, subject to approval by the City Manager.

O. TRAFFIC CONTROL PLAN- Not applicable.

P. PRE-BID INQUIRIES

Bidders with pre-bid inquiries must submit questions in writing to the General Services Department. Any and all questions must be emailed to Diane Megerdichian, Business Manager at [DMegerdichian@torranceca.gov](mailto:DMegerdichian@torranceca.gov). Please list **"555 Maple Avenue Recreational Sports Field"** in the subject line of the email. For questions of a general nature, bidders may contact Diane Megerdichian directly at 310-781-7151

Q. RESPONSIBILITY OF CITY.

The City of Torrance shall not be held responsible for the care or protection of any material or parts of the work prior to final acceptance, except as expressly provided in these specifications.

R. CONSTRUCTION SCHEDULE AND PRECONSTRUCTION CONFERENCE.

The office staff of the City is currently operating on a 9/80 work week; therefore, City Hall is closed every other Friday.

In accordance with the herein Special Provisions, after notification of award and prior to start of any work, **the Contractor shall submit to the City Manager for approval its proposed Construction Schedule within ten (10) working days from the date of Notice of Proceed.** At least two (2) days, exclusive of Saturdays, Sundays and holidays, prior to commencement of work, the Contractor shall attend a pre-construction conference.

**The Contractor will provide all product and equipment submittals to the City of Torrance or designated consultant within ten (10) working days from the date of Notice to Proceed.** The Contractor shall immediately order materials requiring a delivery delay upon receipt of a written notice from the City that the City Council has approved an Award of Contract. Contractor shall provide written proof(s) of timely material order(s) and shall include any delivery delays in the Construction Schedule.

S. PROGRESS OF THE WORK AND TIME FOR COMPLETION

The Contractor shall begin work after the mailing, from the City Manager to the Contractor, by first class mail, postage prepaid, of a Notice to Proceed. **The Contractor shall diligently prosecute the same to completion within ninety (90) calendar days of the start date specified in said Notice.** The ninety calendar day schedule includes, completion of contractual paper work, equipment material submittal review, the lead time for materials and equipment, and on site work. Bidder must complete the field preparation within the first sixty (60) days of the project timeline in order for installation of the synthetic turf within the last thirty (30) calendar days.

During periods when weather or other conditions are unfavorable for construction, the Contractor shall pursue only such portions of the work as shall not be damaged thereby. No portions of the work whose acceptable quality or efficiency will be affected by any unfavorable conditions shall be constructed while those conditions exist. It is expressly understood and agreed by and between the Contractor and the City that the Contract time for completion of the work described herein is a reasonable time taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the work.

T. LIQUIDATED DAMAGES

The Contractor agrees that failure to complete work within the time allowed will result in damages being sustained by the City. Contractor and City agree that failure to complete the project will result in inconvenience to the citizens of Torrance and the City of Torrance and their customers using the affected areas. Such delay will also result in the necessity of several inspections each day to ensure that the project is properly progressing. The parties also agree that failure to complete the project on time will prevent the City from having the use of the facility. Therefore, the parties agree such damages among others are, and will continue to be, impracticable and extremely difficult to determine, but that **Seven Hundred and fifty dollars (\$750) per calendar day** is the minimum value of such costs to the City and is a reasonable amount that the Contractor agrees to reimburse the City for each calendar day of delay in finishing the work in excess of the time specified for completion, plus any authorized time extensions. In addition, **if the project is more than thirty (30) calendar days passed the specified time for completion, the liquidated damages will double to fifteen hundred (\$1,500) dollars per calendar day.**

Execution of the contract under these specifications shall constitute agreement by the Contractor and the City that Seven Hundred fifty Dollars (\$750) per calendar day is the minimum value of the costs and actual damage caused by failure of the Contractor to complete the work within the allotted time, that such sum is liquidated damages and shall not be construed as a penalty, and that such sum may be deducted from payments due the Contractor if such delay occurs. Said amount may be reduced by the City if work is sufficiently completed within the allotted time so that the damages are minimized.

The Contractor will not be assessed liquidated damages for any delay in completion of the work when such delay was caused by the failure of the City or the owner of a utility to provide for removal or relocation of the existing utility facilities; provided, however, that the Contractor shall have given the City and the owner of a utility timely notice of the interference. "Timely notice" shall be defined as a verbal notice (to be followed up in writing) no later than one (1) hour after initial discovery of the interference unless the City Representative is present, in which case notice shall be given immediately in writing to the City Manager.

U. GENERAL PREVAILING WAGE RATE-

Pursuant to Section 1773 of the Labor Code, the general prevailing wage rates in the county in which the work is to be done have been determined by the Director of the California Department of Industrial Relations. These wages are set forth in the General Prevailing Wage Rates for this project, are attached and available from the California Department of Industrial Relations' internet site at <http://www.dir.ca.gov>. Future effective general prevailing wage rates which have been predetermined and are on file with the California Department of Industrial Relations are referenced but not printed in the general prevailing wage rates.

APPRENTICESHIP EMPLOYMENT STANDARDS. Attention is directed to the provisions in Sections 1776, 1777.5 and 1777.6 of the California Labor Code concerning the employment of apprentices by the Contractor or any subcontractor under them.

Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of Industrial Relations, ex officio the Administrator of Apprenticeship, San Francisco, California, or from the division of Apprenticeship Standards and its branch offices.

V. PRELIMINARY NOTICES

Preliminary Notices should be mailed to the following address.

Diane Megerdichian  
General Services Department  
3350 Civic Center Drive  
Torrance, CA 90503

**PART C**  
**SPECIAL PROVISIONS**

## **SECTION A. GENERAL**

The Project Specifications for all work on this project are the specifications contained in the **“Project Manual for 555 Maple Avenue Recreational Sports Field”**, prepared by Land Concern LLC and the City of Torrance.

These Specifications are intended to govern all aspects of the appurtenant construction including, but not limited to, materials, methods and details, except as modified herein or as inconsistent with the provisions hereof.

### **DEFINITIONS**

Whenever the following terms are used, they shall be understood to mean and refer to the following:

Agency or City - City of Torrance.

Board- The City Council of the City of Torrance herein referred to as City Council.

City Manager - The City Manager of the City of Torrance, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

Consulting Architect – Steven Philips  
Land Concern LLC  
1750 E. Deere Avenue  
Sana Ana, CA 92705  
949-250-4822  
949-333-6310 Direct  
[PStevens@landconcern.com](mailto:PStevens@landconcern.com)

Laboratory - The designated laboratory authorized by the City of Torrance to test materials and work involved in the contract.

## **SECTION B. REFERENCE TO STANDARDS OR PUBLICATIONS**

Any reference made in the Contract Documents to any specification, standard, or publication of any organization shall, in the absence of a specific designation to the contrary, be understood to refer to the latest edition of the specification, standard, or publication in effect as of the date of advertising the work, except to the extent that said standard or publication may be in conflict with applicable laws, ordinances, or governing codes. Contractors should be aware of all new code requirements (such as Cal-Green) when dealing with HVAC and other general building work. No requirements of these specifications or the drawings shall be waived because of any provisions of, or omission from, said standards or publications.

## SECTION C. DESCRIPTION OF THE WORK

1. Scope of the Work. The work to be done consists of furnishing all labor, materials, tools, equipment and incidentals complete the replacement of the HVAC units at various locations as shown in the plans and specifications prepared by Bartef Yoosephiance & Associates and the City of Torrance.

## SECTION D. GENERAL PROCEDURES

1. Specifications and Drawings Complementary. The Specifications and Drawings are complementary, and what is called for in one shall be as binding as if called for in both.
2. Order of Precedence of Contract Documents. In resolving conflicts resulting from conflicts, errors, or discrepancies in any of the Contract Documents, the order of precedence shall be as follows:
  - a. Change Orders (Including Plans and Specifications attached thereto).
  - b. Contract Services Agreement
  - c. Addenda
  - d. Special Provisions
  - e. Plans
  - f. Standard Plans
  - g. Instructions to Bidders
  - h. Standard Specifications

Within the Specifications the order of precedence is as follows:

- a. Addenda/Change Orders
- b. Permits from other agencies/supplemental agreements
- c. Special Provisions
- d. Instructions to Bidders
- e. Referenced Standard Drawings
- f. Referenced Standard Specifications

With reference to the Drawings the order of precedence is as follows:

- a. Change Orders drawings govern over Addenda and Contract Drawings
- b. Addenda drawings govern over Contract drawings
- c. Contract drawings govern over shop drawings and standard drawings
- d. Detail drawings govern over general drawings
- e. Figures govern over scaled dimensions

3. Discrepancies in the Contract Documents. Any discrepancies, conflicts, errors or omissions found in the Contract Documents shall be promptly reported in writing to the City Manager, who will issue a correction in writing. The Contractor shall not take advantage of any such discrepancies, conflicts, errors or omissions, but shall comply with any corrective measures regarding the same prescribed by the City Manager, and no additional payment or time shall be allowed therefor.

If discrepancies are discovered between the drawings and the specifications, and no specific interpretation is issued prior to bidding, the decision regarding this interpretation shall rest with the City Manager. The Contractor shall be compelled to act on the City Manager's decision as directed. In the event the installation is not in compliance with the direction of the City Manager, the installation shall be corrected by and at the expense of the Contractor at no additional cost to the City.

See Section C of these Special Provisions for "Claims".

4. Errors and Omissions. If the Contractor, in the course of the work, becomes aware of any claimed errors or omissions in the contract documents or in the City's field work, he shall immediately inform the City Manager. The City Manager shall promptly review the matter, and if the City Manager finds an error or omission has been made the City Manager shall determine the corrective actions and advise the Contractor accordingly. If the corrective work associated with an error or omission increases or decreases the amount of work called for in the Contract, the City shall issue an appropriate Change Order. After discovery of an error or omission by the Contractor, any related work performed by the Contractor shall be done at its risk unless authorized by the City Manager.
5. Changed Conditions. The plans for the work show conditions as they are believed by the City Manager to exist, but it is not intended or to be inferred that the conditions as shown thereon constitute a representation by the City that such conditions are actually existent, nor shall the City be liable for any loss sustained by the Contractor as a result of any variance of the conditions as shown on the plans and the actual conditions revealed during the progress of the work or otherwise. The word "conditions" as used in this paragraph includes, but is not limited to, site conditions, both surface and subsurface.

The Contractor shall examine the site, compare it with the drawings and specifications and shall satisfy itself as to the conditions under which the work is to be performed. The Contractor shall ascertain and check the location of all existing structures, utilities and equipment, which may affect its work. The Contractor shall be responsible to re-examine the site, as necessary, for performance of change orders or other proposed changes, which may affect its work. No allowance shall subsequently be made on the Contractor's behalf for any extra expense or loss of time, which is incurred due to failure or negligence on its part to make such examination.

6. As-built Drawings. The Contractor shall maintain a control set of Plans and Specifications on the Work site at all times. All final locations determined in the field, and any deviations from the Plans and Specifications, shall be marked in red on this control set to show as-built conditions. Upon completion of the Work, the Contractor shall submit the control set to the Engineer for approval. Final payment will not be made until this requirement is met.
7. Construction Staking. The Contractor is responsible for all construction staking and shall be responsible for the cost of any restaking required due to disturbance caused by its operations, failure to protect the work site from vandalism or other causes of loss.

8. Notice to Proceed. Notwithstanding any other provisions of the Contract, the Contractor shall not be obligated to perform any work and the City shall not be obligated to accept or pay for any work performed by the Contractor prior to delivery of a Notice to Proceed. The City's knowledge of work being performed prior to delivery of the Notice to Proceed shall not obligate the City to accept or pay for such work. The Contractor shall provide all required contract bonds and evidences of insurance prior to commencing work at the site.
9. Delay in Obtaining Materials. No extension of time will be granted for a delay caused by the inability to obtain materials unless the Contractor either obtains advance written approval from the City Manager or obtains from the supplier and furnishes to the City Manager documentary proof that such materials could not be obtained due to war, government regulations, labor disputes, strikes, fires, floods, adverse weather necessitating the cessation of work, or other similar action of the elements. The Contractor is required to order materials in a timely manner as specified in the "Instruction to Bidders".
10. Inspection and Testing. The Work is subject to inspection and approval by the CITY. The Contractor shall notify the CITY a minimum of 48 hours in advance of the required inspection.

The CITY will make, or have made, such inspections and tests, as he deems necessary to see that the Work is in conformance with the Contract Documents. In the event such inspections or tests reveal noncompliance with the Contract Documents, the Contractor shall bear the cost of such corrective measures as deemed necessary by the CITY, as well as the cost of subsequent re-inspection and re-testing.

Work done in the absence of inspection by the CITY may be required to be removed and replaced under the inspection of the CITY, and the entire cost of removal and replacement, including the cost of all materials which may be furnished by the CITY and used in the work thus removed, shall be borne by the Contractor, regardless of whether the work removed is found to be defective or not. Work covered without the approval of the CITY shall, if so directed, be uncovered to the extent required by the CITY, and the Contractor shall similarly bear the entire cost of performing all the work and furnishing all the materials necessary for the removal of the covering and its subsequent replacement, including all costs for additional inspection.

The CITY and any authorized representatives shall at all times have access to the Work during its construction at shops and yards as well as the Work site. The Contractor shall provide every reasonable facility for ascertaining that the materials and workmanship are in accordance with the Contract Documents.

Inspection of the Work shall not relieve the Contractor of the obligation to fulfill all conditions of the Contract.

11. Project Schedule

- 11.1 The Contractor shall submit a Construction Schedule in accordance with the project manual to the City Manager prior to beginning construction. No work may be started until the Schedule has been approved in writing. The work shall be scheduled to assure that construction will be completed within the

specified time. The Contractor shall be responsible for coordination of all phases of the operation so that the time schedule can be met.

- 11.2 If the Contractor desires to make a major change in its method or operations after commencing construction or if their Schedule fails to reflect the actual progress, the Contractor shall submit to the City Manager a revised Construction Schedule in advance of beginning revised operations.

12. Mobilization

- 12.1 Scope. Mobilization shall include the provision of the Construction Schedule; site review; obtaining all permits, insurance, and bonds; moving onto the site all plant and equipment; furnishing and erecting plants, temporary buildings, and other construction facilities, and removal of same at completion of the project; all as required for the proper performance and completion of the work.

Mobilization shall include, but not be limited to, the following principle items.

- (a) Submittal and modification, as required, of the Construction Schedule.
- (b) All associated documentation and submittals required by Exhibit A of the contract.
- (c) Installing temporary construction power and wiring.
- (d) Establishing fire protection system.
- (e) Developing construction water supply.
- (f) Providing on-site sanitary facilities and portable water facilities, as required.
- (g) Arranging for and erection of Contractor's work and storage yard.
- (h) Submittal of all required insurance certificates and bonds, including subcontractors.
- (i) Obtaining all required permits.
- (j) Posting all OSHA required notices and establishment of safety programs.
- (k) Have the Contractor's superintendent at the job site full-time.
- (l) Pot-holing and other research and review as necessary to verify site conditions and utility locations, including research and review as necessary for change orders.
- (m) Demobilization.

13. Markup. The following percentages shall apply for additional work:

Profit	5% maximum
Overhead	5% maximum

The markups mentioned hereinafter shall include, but are not limited to, all costs for the services of superintendents, project managers, timekeepers and other personnel not working directly on the change order, and pickup or yard trucks used by the above personnel, and other vehicles and/or equipment present at the jobsite but not directly used in actual construction activities. Incidental movements of labor, materials, supplies or equipment shall not be considered as use in actual construction activities. These costs shall not be reported as labor or equipment elsewhere, except when actually performing work directly on the change order and then shall only be reported at the labor classification of the work performed.

The City shall not pay for the cost of foremen or a superintendent unless authorized in advance by the City Manager. To the sum of the costs and markups provided for in this subsection, one (1) percent shall be added as compensation for bonding.

14. Utilities. The Contractor shall provide coordination with all the utility companies involved and shall provide protection from damage to their facilities. The Contractor shall be responsible for repair or replacement to said facilities made necessary by its failure to provide required protection. The Contractor is required to include utility requirements in the Construction Schedule.

The Contractor shall be solely responsible to check all utility record maps, books, and/or other data in the possession of the CITY, other agencies, and/or all utility companies, and no allowance shall be made for any failure to have done so.

The Contractor shall utilize the services of "Underground Service Alert - Southern California" for utility locating in all public right-of-ways by calling 1-800-227-2600 at least 48 hours prior to any excavation.

15. Completion, Acceptance and Warranty. If, in the CITY's judgment, the Work has been completed and is ready for acceptance, the CITY will so certify and will determine the date when the Work was completed. This will be the date when the Contractor is relieved from responsibility to protect the Work. The CITY may cause a Notice of Completion to be filed and recorded with the Los Angeles County Recorder's Office. At the CITY's option, the CITY may certify acceptance to the City Council who may then cause a Notice of Completion to be filed and recorded with the Los Angeles County Recorder's Office.

Manufacturer's warranties and guaranties furnished for materials used in the Work and instruction sheets and parts listed supplied with materials shall be delivered to the CITY prior to acceptance of the Work. The duration of the warranty or guaranty shall be the standard of the industry with a minimum of 1 year from the date of Notice of Completion.

Manufacturer's warranties shall not relieve the Contractor of liability under these Specifications. Such warranties only shall supplement the Contractor's responsibility.

The CITY may require a manufacturer's warranty on any product offered for use.

16. Contractor's Representative. The Contractor's Representative shall be approved by the CITY prior to the start of the Work. If the designated representative is rejected, the Contractor shall immediately designate another representative in writing and submit to the City for consideration. The CITY shall have the authority to require the Contractor to remove its representative and/or alternate representative at any time and at no cost to the CITY.

17. Water Pollution Control

- 17.1 NPDES Construction Permit, Notice of Intent (NOI) and Notice of Termination (NOT). Construction activities including clearing, grading and excavating that result in land disturbances of equal to or greater than one acre are covered by the National Pollutant Discharge Elimination System General Construction Permit, State Water Board Order No. 2009-0009-DWQ. Dischargers obtaining coverage will file electronically for coverage under Order No. 2009-0009-DWQ. Order No. 2009-0009-DWQ is a Risk Based permitting approach. The Contractor is required to go to the State Water Resources Control Board website and determine risk level and apply for permit and update permit using the Storm Water Multiple Application and Reporting Tracking System (SMARTS). The SMARTS system is an online tool for submitting Notice of Intent (NOI), Notice of Termination (NOT), compliance and monitoring data and Annual Reports when required.

This General Construction Permit regulates pollutants in discharges of storm water associated with construction activity. To obtain authorization for proposed storm water discharges, pursuant to this General Construction Permit, the Contractor must submit use the SMARTS system to submit NOI and pay the appropriate fee to the State Regional Water Quality Control Board (SWQCB). Contractor shall provide to the City the Storm Water Pollution Prevention Plan (SWPPP). The Contractor shall terminate coverage under the General Construction Permit for a complete project by submitting a NOT via the SMARTS system after post construction storm water Best Management Practices (BMPs) are in place and approved by the City.

Full compensation for preparation of the NOI, NOT, required fees, construction, and post construction BMPs, sampling, analysis and reporting as required by Order No. 2009-0009-DWQ and all other related costs shall be considered as included in the bid for Mobilization (or NPDES Compliance).

- 17.2 Storm Water Pollution Prevention Plan (SWPPP). Construction activities covered by the General Construction Permit require submittal by the Contractor of a Storm Water Pollution Prevention Plan (SWPPP) prior to the start of any clearing, demolition, grading or excavation. A Storm Water Pollution Prevention Plan (SWPPP) shall be defined as a report that includes site map(s), identification of construction and contractor activities that could pollute storm water, and a description of measures and practices to control the potential pollutants. The preparation and implementation of the SWPPP is intended to ensure that the Contractor will make every reasonable effort to prevent the pollution of water resources during the period of construction. The size and

nature of this Contract place it under the regulations of the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharge Associated with Construction Activity. In the State of California, these regulations are adopted by the State Water Resources Control Board. These regulations require a SWPPP for any work where clearing, grading, and excavation result in a land disturbance of one or more acres. As a result, the Contractor shall prepare, submit to the CITY for review and approval, and implement a SWPPP for this Contract in compliance with these regulations.

If during construction operations, field conditions change in a manner which, in the opinion of the Engineer, significantly deviates from how the SWPPP, as approved by the CITY, addressed the current construction operation, the Engineer may direct the Contractor to revise the current construction operation and/or the SWPPP. Such directions will be made in writing and will specify the items of work for which the SWPPP is inadequate. No further work on these items will be permitted until the Contractor revises the construction operations to the satisfaction of the Engineer and/or until the Contractor submits a revised SWPPP and receives CITY approval. The Engineer will notify the Contractor of the acceptance or rejection of the revised SWPPP within seven (7) working days from the date of submittal.

The SWPPP shall be submitted to the CITY for review and approval a minimum of fifteen (15) working days prior to the commencement of construction operations in accordance with 6-1 of these Special Provisions. The SWPPP shall remain on the construction site while site is under construction, during working hours, commencing with the initial construction activity and ending with Notice of Termination.

Full compensation for preparation of the SWPPP, revisions to the SWPPP, and all other related costs shall be considered as included in the bid price for Mobilization (or NPDES compliance or prices bid for the various items of work).

- 17.3 Best Management Practices (BMPs). Best Management Practices shall be defined as any program, technology, process, siting criteria, operating method, measure, or device which controls, prevents, removes, or reduces pollution. The Contractor shall obtain and refer to the California Storm Water Best Management Practice Handbooks, Volume 3 Construction BMP Handbook and the Los Angeles County Department of Public Works Best Management Practices Handbook for Construction Activities. These publications are available from:

Los Angeles County  
Department of Public Works  
Cashier's Office  
900 S. Fremont Avenue  
Alhambra, CA 91803  
Telephone (626) 458-6959

The Contractor shall have a minimum of two (2) readily accessible copies of each publication on the Work site at all times.

The Contractor shall implement BMPs in conjunction with the following construction operation and activities:

CONSTRUCTION PRACTICES	Clearing, Grading and Excavating
	Water Conservation Practices
	Dewatering
	Paving Operations
	Structure Construction and Painting
MATERIAL MANAGEMENT	Material Delivery and Storage
	Material Use
	Spill Prevention and Control
WASTE MANAGEMENT	Solid Waste Management
	Hazardous Waste Management
	Contaminated Soil Management
	Concrete Waste Management
	Sanitary/Septic Waste Management
VEHICLE AND EQUIPMENT MANAGEMENT	Vehicle and Equipment Cleaning
	Vehicle and Equipment Fueling
	Vehicle and Equipment Maintenance

The Contractor shall implement the following BMPs in conjunction with the previously listed construction operation activities:

VEGETATIVE STABILIZATION	Scheduling of Planting
	Preservation of Existing Vegetation
	Temporary Seeding and Planting
	Mulching
PHYSICAL STABILIZATION	Geotextiles and Mats
	Soil Stabilizer/Dust Control
	Temporary Stream Crossing
	Stabilized Construction Roadway
	Stabilized Construction Entrance
RUNOFF DIVERSION	Sodding, Grass Plugging, and Vegetative Buffer strips
	Earth Dikes, Drainage Swales, and Lined Ditches
	Top and Toe of Slope Diversion Ditches/Berms
	Slope Drains and Subsurface Drains
VELOCITY REDUCTION	Flared Culvert End Sections
	Outlet Protection/Velocity Dissipation Devices
	Check Dams
	Slope Roughening/Terracing/Rounding

SEDIMENT TRAPPING	Slit Fences
	Straw Bale Barrier
	Sand Bag Barrier
	Brush or Rock Filter
	Storm Drain Inlet Protection
	Sediment Traps
	Sediment Basin

Additional BMPs may be required as a result of a change in actual field conditions, contractor activities, or construction operations. When more than one BMP is listed under each specific BMP category, the Contractor shall select the appropriate and necessary number of BMPs within each category in order to achieve the BMP objective.

BMPs for contractor activities shall be continuously implemented throughout the year. BMPs for erosion control and sedimentation shall be implemented during the period from October 15 to April 15, and whenever the National Weather Service predicts rain within 24 hours. BMPs for erosion control and sedimentation shall also be implemented prior to the commencement of any contractor activity or construction operation that may produce run-off, and whenever run-off from other sources may occur.

The CITY is subject to enforcement actions by the State Water Resources Control Board, the Environmental Protection Agency and private citizens. The CITY may assess the Contractor a penalty of \$1,000 for each calendar day that the Contractor has not fully implemented the appropriate BMPs and/or is otherwise in noncompliance with these provisions. In addition, the CITY will deduct, from the final payment due the Contractor, the total amount of any fines levied on the CITY, plus legal and staff costs, as a result of the Contractor's lack of compliance with these provisions and/or less than complete implementation of the appropriate BMPs.

Full compensation for the implementation of BMPs, including the construction, removal, and the furnishing of all necessary labor, equipment, and materials, shall be considered as included in the price bid for Mobilization (or NPDES compliance or the various items of work).

## **SECTION E. PAYMENTS TO CONTRACTOR AND CLAIMS**

1. Breakdown of Contract Prices. The Contractor shall, within ten (10) working days of receipt of a request from the City, submit a complete breakdown of lump sum bid prices showing the value assigned to each part of the work, including an allowance for profit and overhead. The breakdown shall include separate line for each subcontractor's bid and/or contract amount. In submitting the breakdown, the Contractor certifies that it is not unbalanced and that the value assigned to each part of the work represents its estimate of the actual cost, including profit and overhead, of performing that part of the work. The breakdown shall be sufficiently detailed to permit its use by the City Manager as one of the bases for evaluating requests for payment. No extra costs shall be allowed for these breakdowns.

2. Payment for Labor and Materials. The Contractor shall pay and cause the subcontractors to pay any and all accounts for labor, including Worker's Compensation premiums, State Unemployment and Federal Social Security payments and all other wage and salary deductions required by law. The Contractor also shall pay and cause the subcontractors to pay any and all accounts for services, equipment and materials used by it and the subcontractors during the performance of work under this contract. All such accounts shall be paid as they become due and payable. If requested by the City Manager, the Contractor shall immediately furnish the City with proof of payment of such accounts.
3. Additional Work. Payment for additional work and all expenditures in excess of the bid amount must be authorized in writing by the City Manager. Such authorization shall be obtained by the Contractor prior to engaging in additional work. It shall be the Contractor's sole responsibility to obtain written approval from the City Manager for any change(s) in material or in the work proposed by suppliers or subcontractors. No payment shall be made to the Contractor for additional work which has not been approved in writing, and the Contractor hereby agrees that it shall have no right to additional compensation for any work not so authorized.
4. Claims. The Contractor shall not be entitled to the payment of any additional compensation for any cause, including any act, or failure to act, by the City, or the happening of any event, thing or occurrence, unless he shall have given the City due written notice of potential claim as hereinafter specified.

The written notice of potential claim shall set forth the reasons for which the Contractor believes additional compensation will or may be due, the nature of the costs involved, and, insofar as possible, the amount of the potential claim. Said notice shall be submitted on a form approved by the City at least forty-eight (48) hours (two working days) in advance of performing said work, unless the work is of an emergency nature, in which case the Contractor shall notify and obtain approval from the Inspector prior to commencing the work. The City Manager may require the Contractor to delay construction involving the claim, but no other work shall be delayed, and the Contractor shall not be allowed additional costs for any said delay but may be allowed on extension of time if the City Manager agrees that the work delayed is a controlling element of the Construction Schedule. The Contractor shall be required to submit any supporting data (or a detailed written explanation justifying further delay) within five (5) Work Days of a request from the City Manager and shall be responsible for any delays resulting from late and/or incomplete submittals. By submitting a Bid, the Contractor hereby agrees that this Section shall supersede Sections 6-6.3 and 6-6.4 of the Standard Specifications.

The City shall be the sole authority to interpret all plans, specifications and contract documents, and no claim shall be accepted which is based on the Contractor's ignorance, misunderstanding or noncompliance with any provision or portion thereof. The Contractor shall be responsible to provide all data and to obtain all approvals required by said Specifications. No claims or extras shall be approved by the City unless all work was done under the direction of and subject to the approval of the Inspector.

It is the intention of this Subsection that differences between the parties arising under and by virtue of the Contract be brought to the attention of the City Manager at the earliest possible time in order that such matters may be settled, if possible, or other

appropriate action promptly taken. The Contractor hereby agrees that it shall have no right to additional compensation for any claim that may be based on any such act, failure to act, event, thing or occurrence for which no written notice of potential claim as herein required was filed.

5. Noncompliance with Plans and Specifications. Failure of the Contractor to comply with any requirement of the Plans and Specifications, and/or to immediately remedy any such noncompliance upon notice from the City Manager, may result in suspension of Contract Progress Payments. Any Progress Payments so suspended shall remain in suspension until the Contractor's operations and/or submittals are brought into compliance to the satisfaction of the City Manager. No additional compensation shall be allowed as a result of suspension of Progress Payments due to noncompliance with the plans or specifications. The Contractor shall not be permitted to stop work due to said suspension of Progress Payments.
6. Request for Payment. Contractor shall submit all requests for payment on AIA Document G702 – Application and Certificate for Payment and G703- Continuation Sheet. For each item provide a column for listing: Item Number; Description of Work; Scheduled Value, Previous Application; Authorized Change Orders; Total completed and Stored to Date of Application; Percentage of Completion; Balance to Finish; and Retainage.

Prior to submittal of said form, all items for which payment is requested shall be checked and approved in writing by the City Manager. No payments will be made unless all back-up data is submitted with the payment request and the Progress Payment Invoice is signed by both Contractor and Manager.

The City will retain 5 percent of the value of all work done and materials installed as part security for fulfillment of the contract by Contractor. The full 5 percent retention will be retained on all payments for 35 days after the filing of the Notice of Completion.

There shall be no separate payment for any relocations, barriers or forms, grading or temporary construction required to construct the improvements herein. Payment for these items shall be absorbed in the Bid Prices for the applicable work to which they are appurtenant, and no extra costs shall be allowed.

The payment of amounts due to the Contractor shall be contingent upon the Contractor furnishing the City with a release of all claims against the City arising by virtue of the Contract related to said amounts. It is the contractor's responsibility to provide the correct releases in order to obtain payment by the City. The Contractor shall provide the City with Unconditional Lien Release on Final Payment with a zero balance is required from all material suppliers and subcontractors with the request for final payment.

**PART D**  
**BID DOCUMENTS**

## BIDDER'S PROPOSAL

### BID FOR 555 MAPLE AVENUE RECREATIONAL SPORTS FIELD B2013-40

In accordance with the Notice Inviting Bids pertaining to the receiving of sealed proposals by the City Clerk of the City of Torrance for the above titled improvement, the undersigned hereby proposes to furnish all work to be performed in accordance with the Plans, Specifications and Contract Documents, prepared by Land Concern LLC and City of Torrance for the bid as set forth in the following schedules.

Assignment of Contractor's values:

Item	Description	Total Amount In Figures*
Division 01	General Requirements:	
Division 02	Site Work:	
Division 03	Concrete:	
Division 04	Masonry:	
Division 05	Metals:	
Division 06	Wood and Plastics:	
Division 07	Thermal and Moisture Protection:	
Division 08	Doors and Windows:	
Division 09	Finishes:	
Division 10	Specialties:	
Division 11	Equipment:	
Division 12	Furnishings:	
Division 13	Special Construction:	



**ACKNOWLEDGMENT OF ADDENDA RECEIVED**

B2013-40

The Bidder shall acknowledge the receipt of addenda by placing an "X" by each addendum received.

Addendum No. 1 \_\_\_\_\_

Addendum No. 2 \_\_\_\_\_

Addendum No. 3 \_\_\_\_\_

Addendum No. 4 \_\_\_\_\_

Addendum No. 5 \_\_\_\_\_

Addendum No. 6 \_\_\_\_\_

Addendum No. 7 \_\_\_\_\_

Addendum No. 8 \_\_\_\_\_

If an addendum or addenda have been issued by the City and not noted above as being received by the Bidder, the Bid Proposal may be rejected.

\_\_\_\_\_  
Bidder's Signature

\_\_\_\_\_  
Date

**CONTRACTOR'S AFFIDAVIT**  
**B2013-40**

1. That he is the \_\_\_\_\_  
Title  
of \_\_\_\_\_  
(Name of Partnership, Corporation, or Sole Proprietorship)

2. That said proposal is genuine; that the same is not sham; that all statement of facts therein are true;
3. That such proposal was not made in the interest or behalf of any person, partnership company, association, organization or corporation not named or disclosed;
4. That the Contractor did not directly or indirectly induce, solicit or agree with any-one else to submit a false or sham bid, refrain from bidding, or withdraw the bid, to raise or fix the bid price of the Contractor or anyone else, or to raise or fix any overhead, profit or cost element of the Contractor's price or the price of anyone else; and did not attempt to induce action prejudicial to the interest of the City of Torrance or any other bidder, or anyone else interested in the proposed contract;
5. That the Contractor has not in any manner sought by collusion to secure for itself an advantage over any other bidder or to induce action prejudicial to the interests of the City of Torrance, or of any other bidder or of anyone else interested in the proposed contract;
6. That the Contractor has not accepted any bid from any subcontractor or materialman through any bid depository, the bylaws, rules or regulations of which prohibit or prevent the Contractor from considering any bid from any subcontractor or materialman, which is not processed through said bid depository, or which prevent any subcontractor or materialman from bidding to any contractor who does not use the facilities of or accept bids from or through such bid depository;

**CONTRACTOR'S AFFIDAVIT B2013-40 (CONTINUED)**

7. That the Contractor did not, directly or indirectly, submit the Contractor's bid price or any breakdown thereof, or the contents thereof, or divulge information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, or to any individual or group of Individuals, except to the City of Torrance, or to any person or persons who have a partnership or other financial interest with said Contractor in its business.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Subscribed and Sworn to

before me this \_\_\_\_\_

of \_\_\_\_\_, 20\_\_\_\_\_

\_\_\_\_\_  
(Contractor)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
Notary Public in and for said

County and State.

(Seal)

**BID BOND**

B2013-40

**KNOW ALL MEN BY THESE PRESENTS:** That we, \_\_\_\_\_

as principal, and \_\_\_\_\_  
as sureties, are held and firmly bound unto the City of Torrance, State of California, in the penal  
sum of \_\_\_\_\_ dollars (\$\_\_\_\_\_), for the payment whereof we  
hereby bind ourselves, our successors, heirs, executors or administrators jointly and severally,  
firmly by these presents.

The condition of this obligation is such that, whereas the above bounded principal is about to file  
with and submit to the City of Torrance a bid or proposal for the performance of certain work as  
required in the City of Torrance, Project No. B2013-40, said work being: 555 Maple Avenue  
Recreational Sports Field, in compliance with the Specifications therefore under an invitation of  
said City contained in a notice or advertisement for bids or proposals; now if the bid or proposal  
of said principal shall be accepted and if said work be thereupon awarded to the principal by  
said City and if the said principal shall enter into a contract with the said City in accordance with  
said bid or proposal, or if the bid or proposal of the said principal is rejected, then this bond shall  
be void and of no effect and otherwise in full force and effect.

**WITNESS** our hands this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_\_.

\_\_\_\_\_  
Principal

\_\_\_\_\_  
Surety/Attorney-in-Fact

\_\_\_\_\_  
Signature

Name: \_\_\_\_\_  
Local Address: \_\_\_\_\_  
Phone No.: \_\_\_\_\_  
Fax No.: \_\_\_\_\_

### **LIST OF SUBCONTRACTORS**

The Bidder is required to fill in the following blanks in accordance with the provisions of the Subletting and Subcontracting Fair Practices Act (Chapter 2 of Division 5, Title 1 of the Government Code of the State of California) and should familiarize itself with Section 2-3 of the Standard Specifications.

1. Name Under Which Subcontractor is Licensed: \_\_\_\_\_

Subcontractor's Address: \_\_\_\_\_

Specific Description of Sub-Contract: \_\_\_\_\_

License Number: \_\_\_\_\_ CA License Classification/Type: \_\_\_\_\_

2. Name Under Which Subcontractor is Licensed: \_\_\_\_\_

Subcontractor's Address: \_\_\_\_\_

Specific Description of Sub-Contract: \_\_\_\_\_

License Number: \_\_\_\_\_ CA License Classification/Type: \_\_\_\_\_

3. Name Under Which Subcontractor is Licensed: \_\_\_\_\_

Subcontractor's Address: \_\_\_\_\_

Specific Description of Sub-Contract: \_\_\_\_\_

License Number: \_\_\_\_\_ CA License Classification/Type: \_\_\_\_\_

4. Name Under Which Subcontractor is Licensed: \_\_\_\_\_

Subcontractor's Address: \_\_\_\_\_

Specific Description of Sub-Contract: \_\_\_\_\_

License Number: \_\_\_\_\_ CA License Classification/Type: \_\_\_\_\_

Subcontractors listed in accordance with the provisions of Section 2-3 must be properly licensed under the laws of the State of California for the type of work which they are to perform. Do not list alternate subcontractors for the same work.

## REFERENCES

(Bidder must have completed nine (9) full size soccer or football fields within the last three (3) years). The references must reflect this requirement.

1. Name (Firm/Agency): \_\_\_\_\_

Address: \_\_\_\_\_

Contact Person: \_\_\_\_\_ Telephone No.: \_\_\_\_\_

Title of Project: \_\_\_\_\_

Project Location: \_\_\_\_\_

Date of Completion \_\_\_\_\_ Contract Amount: \$ \_\_\_\_\_

2. Name (Firm/Agency): \_\_\_\_\_

Address: \_\_\_\_\_

Contact Person: \_\_\_\_\_ Telephone No.: \_\_\_\_\_

Title of Project: \_\_\_\_\_

Project Location: \_\_\_\_\_

Date of Completion \_\_\_\_\_ Contract Amount: \$ \_\_\_\_\_

3. Name (Firm/Agency): \_\_\_\_\_

Address: \_\_\_\_\_

Contact Person: \_\_\_\_\_ Telephone No.: \_\_\_\_\_

Title of Project: \_\_\_\_\_

Project Location: \_\_\_\_\_

Date of Completion \_\_\_\_\_ Contract Amount: \$ \_\_\_\_\_

4. Name (Firm/Agency): \_\_\_\_\_

Address: \_\_\_\_\_

Contact Person: \_\_\_\_\_ Telephone No.: \_\_\_\_\_

Title of Project: \_\_\_\_\_

Project Location: \_\_\_\_\_

Date of Completion \_\_\_\_\_ Contract Amount: \$ \_\_\_\_\_

### **Bidder's Information**

The bidder must provide a detailed list of the trades and the description of the work they will perform with their own company for this project.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_
11. \_\_\_\_\_
12. \_\_\_\_\_
13. \_\_\_\_\_
14. \_\_\_\_\_

Contractor's License No.: \_\_\_\_\_ Class: \_\_\_\_\_

Date first obtained: \_\_\_\_\_

Has License ever been suspended or revoked? \_\_\_\_\_

If yes, describe when and why \_\_\_\_\_

Any current claims against License or Bond? \_\_\_\_\_

If yes, describe claims: \_\_\_\_\_

Type of entity (check one)

\_\_\_\_\_ Incorporated \_\_\_\_\_ Partnership \_\_\_\_\_ Sole Proprietorship

If incorporated, in what state \_\_\_\_\_

Federal Tax ID Number # \_\_\_\_\_

Principals in Company (List all - attach additional sheets if necessary):

<u>NAME</u>	<u>TITLE</u>	<u>LICENSE NO.</u> (If Applicable)
_____	_____	_____
_____	_____	_____
_____	_____	_____

**PART E**

**DOCUMENTS TO BE COMPLETED  
AND DELIVERED TO CITY AS PART  
OF CONTRACT WITH THE CITY**

## PERFORMANCE BOND

### KNOW ALL MEN BY THESE PRESENTS:

That we, \_\_\_\_\_ as Principal(s) and \_\_\_\_ a \_\_\_\_\_ corporation, incorporated, organized, and existing under the laws of the State of \_\_\_\_\_, and authorized to execute bonds and undertakings and to do a general surety business in the State of California, as Surety, are jointly and severally held and firmly bound unto the City of Torrance, a municipal corporation, located in the County of Los Angeles, State of California, in the full and just sum of: \_\_\_\_\_ Dollars (\$ \_\_\_\_\_), lawful money of the United States of America, for the payment of which sum, well and truly to be made, we bind ourselves and our respective heirs, executors, administrators, representative, successors and assigns, jointly and severally, firmly by these presents.

**THE CONDITION OF THIS OBLIGATION IS SUCH**, that: WHEREAS, said Principal(s) have/has entered into, or are/is about to enter into, a certain written contract or agreement, dated as of the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, with the said City of Torrance for the 555 MAPLE AVENUE RECREATIONAL SPORTS FIELD B2013-40, all as is more specifically set forth in said contract or agreement, a full, true and correct copy of which is hereunto attached, and hereby referred to and by this reference incorporated herein and made a part hereof;

**NOW, THEREFORE**, if the said Principal(s) shall faithfully and well and truly do, perform and complete, or cause to be done, performed and complete, each and all of the covenants, terms, conditions, requirements, obligations, acts and things, to be met, done or performed by said Principal(s), including any guarantee period as set forth in, or required by, said contract or agreement, all at and within the time or times, and in the manner as therein specified and contemplated, then this bond and obligation shall be null and void; otherwise it shall be and remain in full force, virtue and effect.

The said Surety, for value received, hereby stipulates and agrees that no amendment, change, extension of time, alteration or addition to said contract or agreement, or of any feature or item or items of performance required therein or there under, shall in any manner affect its obligations on or under this bond; and said Surety does hereby waive notice of any such amendment, change, extension of time, alteration, or addition to said contract or agreement, and of any feature or item or items of performance required therein or there under.

**PERFORMANCE BOND B2013-40 (CONTINUED)**

In the event any suit, action or proceedings is instituted to recover on this bond or obligation, said Surety will pay, and does hereby agree to pay, as attorney's fees for said City, such sum as the Court in any such suit, action or proceeding may adjudge reasonable.

**EXECUTED, SEALED AND DATED** this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

CORPORATE SEAL

PRINCIPAL(S):

BY \_\_\_\_\_

BY \_\_\_\_\_

CORPORATE SEAL

SURETY:

BY \_\_\_\_\_

Name: \_\_\_\_\_

Local Address: \_\_\_\_\_

Phone No.: \_\_\_\_\_

Fax No.: \_\_\_\_\_

**LABOR AND MATERIAL BOND**  
B2013-40

**KNOW ALL MEN BY THESE PRESENTS:**

That we, \_\_\_\_\_  
As Principal(s) and \_\_\_\_\_ a  
corporation, incorporated, organized, and existing under the laws of the State of  
\_\_\_\_\_, and authorized to execute bonds and undertakings and to do a general  
surety business in the State of California, as Surety, are jointly and severally held and firmly  
bound unto:

- (a) The State of California for the use and benefit of the State Treasurer, as ex-officio Treasurer and custodian of the Unemployment Fund of said State; and
- (b) The City of Torrance, California; and
- (c) Any and all persons who do or perform or who did or performed work or labor upon or in connection with the work or improvement referred to in the contract or agreement hereinafter mentioned; and
- (d) Any and all materialmen, persons, companies, firms, association, or corporations, supplying or furnishing any materials, provisions, provender, transportation, appliances or power, or other supplies used in, upon, for or about or in connection with the performance of the work or improvement contracted to be executed, done, made or performed under said contract or agreement; and
- (e) Any and all persons, companies, firms, associations, or corporations furnishing, renting, or hiring teams, equipment, implements or machinery for, in connection with, or contributing to, said work to be done or improvement to be made under said contract or agreement; and
- (f) Any and all persons, companies, firms, associations, or corporations who supply both work and materials;

and whose claim has not been paid by said Principal(s), in full and just sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_), lawful money of the United States of America, for the payment of which will and truly to be made, said Principal(s) and said Surety do hereby bind themselves and their respective heirs, executors, administrators, representatives, successors and assigns, jointly and severally, firmly by these presents.

## **LABOR AND MATERIAL BOND (CONTINUED)**

**THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH, THAT: WHEREAS,** said Principal(s) have/has entered into or are/is about to enter into a certain written contract or agreement, dated as of the \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_, with the City of Torrance for the 555 MAPLE AVENUE RECREATIONAL SPORTS FIELD, B2013-40, all as is more specifically set forth in said contract or agreement, a full, true and correct copy of which is hereunto attached, and hereby referred to and by this reference incorporated herein and made a part hereof;

**NOW, THEREFORE,** if the said Principal(s) (or any of his/her, its, or their subcontractors) under said contract or agreement fails or fail to pay:

- (1) For any materials, provisions, provender, transportation, appliances, or power, or other supplies; or
- (2) For the hire of any teams, equipment, implements, or machinery; or
- (3) For any work or labor; supplies, furnished, provided, used, done or performed in, upon, for or about or in connection with the said work or improvement; or
- (4) For amounts due under the Unemployment Insurance Act of the State of California with respect to such work or improvement;

the Surety on this bond will pay the same in an amount not exceeding the sum hereinabove specified in this bond; and, also, in case suit is brought upon this bond, said Surety will (and does hereby agree to) pay a reasonable attorney's fee, to be fixed and taxed as costs, and included in the judgment therein rendered.

This bond shall (and it is hereby made to) insure to the benefit of any and all persons entitled to file claims under Section 1192.1 of the Code of Civil Procedure of the State of California, so as to give a right of action to them or their assigns in any suit brought upon this bond, all as contemplated under the provisions of Section 4205 of the Government Code, and of Chapter 1 of Title 4 of Part 3 of the Code of Civil Procedure, of the State of California.

This bond is executed and filed in connection with said contract or agreement hereunto attached to comply with each and all of the provisions of the laws of the State of California above mentioned or referred to, and of all amendments thereto, and the obligors so intend and do hereby bind themselves accordingly.

**LABOR AND MATERIAL BOND B2013-40 (CONTINUED)**

The said Surety, for value received, hereby stipulates and agrees that no amendment, change, extension of time, alteration, or addition to said contract or agreement, or of any feature or item or items of performance required therein or thereunder, shall in any manner affect its obligations on or under this bond; and said Surety does hereby waive notice of any such amendment, change, extension of time, alteration, or addition to said contract or agreement, and of any feature or item or items of performance required therein or thereunder.

**EXECUTED, SEALED AND DATED** this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_\_

CORPORATE SEAL

PRINCIPAL:

BY \_\_\_\_\_

CORPORATE SEAL

SURETY:

BY \_\_\_\_\_

Name: \_\_\_\_\_  
Local Address: \_\_\_\_\_  
Phone No.: \_\_\_\_\_  
Fax No.: \_\_\_\_\_

## **PUBLIC WORKS AGREEMENT**

This PUBLIC WORKS AGREEMENT ("Agreement") is made and entered into as of Effective Date, by and between the CITY OF TORRANCE, a municipal corporation ("CITY"), and Company Name, type of Entity.

### **RECITALS:**

- A. The CITY wishes to retain the services of an experienced and qualified CONTRACTOR to furnish all labor, materials, tools, equipment and incidentals in accordance with the plans and specifications prepared for the City of Torrance by Land Concern LLC;
- B. In order to obtain the desired services, The CITY has circulated a Notice Inviting Bids for 555 Maple Avenue Recreational Sports Field, Notice Inviting Bids No. **B2013-40**(the "NIB"); and
- C. CONTRACTOR has submitted a Bid (the "Bid") in response to the NIB. CONTRACTOR represents that it is qualified to perform those services requested in the Plans and Specifications. Based upon its review of all Bids submitted in response to the NIB, The CITY is willing to award the contract to CONTRACTOR.

### **AGREEMENT:**

#### **1. SERVICES TO BE PERFORMED BY CONTRACTOR**

CONTRACTOR will provide the services and install those materials listed in the Plans and Specifications, which are on file in the General Services Department. The NIB and the Plans and Specifications are made a part of this Agreement. A copy of the Bid is attached as Exhibit A.

#### **2. TERM**

Unless earlier terminated in accordance with Paragraph 4 below, this Agreement will continue in full force and effect for one year from Effective Date.

#### **3. COMPENSATION**

##### **A. CONTRACTOR's Fee.**

For services rendered pursuant to this Agreement, CONTRACTOR will be paid in accordance with CONTRACTOR's Bid; provided, however, that in no event will the total amount of money paid the CONTRACTOR, for services initially contemplated by this Agreement, exceed the sum of \$ unless otherwise first approved in writing by the CITY

##### **B. Schedule of Payment.**

Provided that the CONTRACTOR is not in default under the terms of this Agreement, upon presentation of an invoice, CONTRACTOR will be paid monthly, within 30 days after the date of the monthly invoice.

#### 4. **TERMINATION OF AGREEMENT**

##### A. Termination by CITY for Convenience.

1. CITY may, at any time, terminate the Agreement for CITY's convenience and without cause.
2. Upon receipt of written notice from CITY of such termination for CITY's convenience, CONTRACTOR will:
  - a. cease operations as directed by CITY in the notice;
  - b. take actions necessary, or that CITY may direct, for the protection and preservation of the work; and
  - c. except for work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.
3. In case of such termination for CITY's convenience, CONTRACTOR will be entitled to receive payment for work executed; and costs incurred by reason of such termination, along with reasonable overhead and profit on the work not executed.

##### B. Termination for Cause.

1. If either party fails to perform any term, covenant or condition in this Agreement and that failure continues for 15 calendar days after the nondefaulting party gives the defaulting party written notice of the failure to perform, this Agreement may be terminated for cause; provided, however, that if during the notice period the defaulting party has promptly commenced and continues diligent efforts to remedy the default, the defaulting party will have such additional time as is reasonably necessary to remedy the default.
2. In the event this Agreement is terminated for cause by the default of the CONTRACTOR, the CITY may, at the expense of the CONTRACTOR and its surety, complete this Agreement or cause it to be completed. Any check or bond delivered to the CITY in connection with this Agreement, and the money payable thereon, will be forfeited to and remain the property of the CITY. All moneys due the CONTRACTOR under the terms of this Agreement will be retained by the CITY, but the retention will not release the CONTRACTOR and its surety from liability for the default. Under these circumstances, however, the CONTRACTOR and its surety will be credited with the amount of money retained, toward any amount by which the cost of completion exceeds the Agreement Sum and any amount authorized for extra services.
3. Termination for cause will not affect or terminate any of the rights of the CITY as against the CONTRACTOR or its surety then existing, or which may thereafter accrue because of the default; this provision is in addition to all other rights and remedies available to the CITY under law.

C. Termination for Breach of Law.

In the event the CONTRACTOR or any of its officers, directors, shareholders, employees, agents, subsidiaries or affiliates is convicted (i) of a criminal offense as an incident to obtaining or attempting to obtain a public or private contract or subcontract, or in the performance of a contract or subcontract; (ii) under state or federal statutes of embezzlement, theft, forgery, bribery, falsification or destruction of records, receiving stolen property, or any other offense indicating a lack of business integrity or business honesty which currently, seriously, and directly affects responsibility as a public consultant or contractor; (iii) under state or federal antitrust statutes arising out of the submission of bids or proposals; or (iv) of violation of Paragraph 19 of this Agreement; or for any other cause the CITY determines to be so serious and compelling as to affect CONTRACTOR's responsibility as a public consultant or contractor, including but not limited to, debarment by another governmental agency, then the CITY reserves the unilateral right to terminate this Agreement or to impose such other sanctions (which may include financial sanctions, temporary suspensions or any other condition deemed appropriate short of termination) as it deems proper. The CITY will not take action until CONTRACTOR has been given notice and an opportunity to present evidence in mitigation.

5. **FORCE MAJEURE**

If any party fails to perform its obligations because of strikes, lockouts, labor disputes, embargoes, acts of God, inability to obtain labor or materials or reasonable substitutes for labor or materials, governmental restrictions, governmental regulations, governmental controls, judicial orders, enemy or hostile governmental action, civil commotion, fire or other casualty, or other causes beyond the reasonable control of the party obligated to perform, then that party's performance shall be excused for a period equal to the period of such cause for failure to perform.

6. **RETENTION OF FUNDS**

CONTRACTOR authorizes the CITY to deduct from any amount payable to CONTRACTOR (whether or not arising out of this Agreement) any amounts the payment of which may be in dispute or that are necessary to compensate the CITY for any losses, costs, liabilities, or damages suffered by the CITY, and all amounts for which the CITY may be liable to third parties, by reason of CONTRACTOR's negligent acts or omissions or willful misconduct in performing or failing to perform CONTRACTOR's obligations under this Agreement. In the event that any claim is made by a third party, the amount or validity of which is disputed by CONTRACTOR, or any indebtedness exists that appears to be the basis for a claim of lien, the CITY may withhold from any payment due, without liability for interest because of the withholding, an amount sufficient to cover the claim. The failure of the CITY to exercise the right to deduct or to withhold will not, however, affect the obligations of CONTRACTOR to insure, indemnify, and protect the CITY as elsewhere provided in this Agreement.

**7. THE CITY'S REPRESENTATIVE**

Jon Landis, Facility Services Manager is designated as the "City Representative," authorized to act in its behalf with respect to the work and services specified in this Agreement and to make all decisions in connection with this Agreement. Whenever approval, directions, or other actions are required by the CITY under this Agreement, those actions will be taken by the City Representative, unless otherwise stated. The City Manager has the right to designate another City Representative at any time, by providing notice to CONTRACTOR.

**8. CONTRACTOR REPRESENTATIVE(S)**

The following principal(s) of CONTRACTOR are designated as being the principal(s) and representative(s) of CONTRACTOR authorized to act in its behalf with respect to the work specified in this Agreement and make all decisions in connection with this Agreement:

Company Representative

**9. INDEPENDENT CONTRACTOR**

The CONTRACTOR is, and at all times will remain as to the CITY, a wholly independent contractor. Neither the CITY nor any of its agents will have control over the conduct of the CONTRACTOR or any of the CONTRACTOR's employees, except as otherwise set forth in this Agreement. The CONTRACTOR may not, at any time or in any manner, represent that it or any of its agents or employees are in any manner agents or employees of the CITY.

**10. BUSINESS LICENSE**

The CONTRACTOR must obtain a City business license prior to the start of work under this Agreement, unless CONTRACTOR is qualified for an exemption.

**11. OTHER LICENSES AND PERMITS**

CONTRACTOR warrants that it has all professional, contracting and other permits and licenses required to undertake the work contemplated by this Agreement.

**12. FAMILIARITY WITH WORK**

By executing this Agreement, CONTRACTOR warrants that CONTRACTOR (a) has thoroughly investigated and considered the scope of services to be performed, (b) has carefully considered how the services should be performed, and (c) fully understands the facilities, difficulties and restrictions attending performance of the services under this Agreement. If the services involve work upon any site, CONTRACTOR warrants that CONTRACTOR has or will investigate the site and is or will be fully acquainted with the conditions there existing, prior to commencement of services set forth in this Agreement. Should CONTRACTOR discover any latent or unknown conditions that will materially affect the performance of the services set forth in this Agreement, CONTRACTOR must

immediately inform the CITY of that fact and may not proceed except at CONTRACTOR's risk until written instructions are received from the CITY.

**13. CARE OF WORK**

CONTRACTOR must adopt reasonable methods during the life of the Agreement to furnish continuous protection to the work, and the equipment, materials, papers, documents, plans, studies and other components to prevent losses or damages, and will be responsible for all damages, to persons or property, until acceptance of the work by the CITY, except those losses or damages as may be caused by the CITY's own negligence.

**14. CONTRACTOR'S ACCOUNTING RECORDS; OTHER PROJECT RECORDS**

Records of the CONTRACTOR's time pertaining to the project, and records of accounts between the CITY and the CONTRACTOR, will be kept on a generally recognized accounting basis. CONTRACTOR will also maintain all other records, including without limitation specifications, drawings, progress reports and the like, relating to the project. All records will be available to the CITY during normal working hours. CONTRACTOR will maintain these records for three years after final payment.

**15. INDEMNIFICATION**

CONTRACTOR will indemnify, defend, and hold harmless CITY, the City Council, each member thereof, present and future, its officers, agents and employees from and against any and all liability, expenses, including defense costs and legal fees, and claims for damages whatsoever, including, but not limited to, those arising from breach of contract, bodily injury, death, personal injury, property damage, loss of use, or property loss however the same may be caused and regardless of the responsibility for negligence. The obligation to indemnify, defend and hold harmless includes, but is not limited to, any liability or expense, including defense costs and legal fees, arising from the negligent acts or omissions, or willful misconduct of CONTRACTOR, its officers, employees, agents, subcontractors or vendors. It is further agreed, CONTRACTOR's obligations to indemnify, defend and hold harmless will apply even in the event of concurrent negligence on the part of CITY, the City Council, each member thereof, present and future, or its officers, agents and employees, except for liability resulting solely from the negligence or willful misconduct of CITY, its officers, employees or agents. Payment by CITY is not a condition precedent to enforcement of this indemnity. In the event of any dispute between CONTRACTOR and CITY, as to whether liability arises from the sole negligence of the CITY or its officers, employees, agents, subcontractors or vendors, CONTRACTOR will be obligated to pay for CITY's defense until such time as a final judgment has been entered adjudicating the CITY as solely negligent. CONTRACTOR will not be entitled in the event of such a determination to any reimbursement of defense costs including but not limited to attorney's fees, expert fees and costs of litigation.

**16. NON-LIABILITY OF THE CITY'S OFFICERS AND EMPLOYEES**

No officer or employee of the CITY will be personally liable to CONTRACTOR, in the event of any default or breach by the CITY or for any amount that may become due to CONTRACTOR.

## **17. INSURANCE**

- A. CONTRACTOR must maintain at its sole expense the following insurance, which will be full coverage not subject to self insurance provisions:
  - (1) Automobile Liability, including owned, non-owned and hired vehicles, with at least the following limits of liability:
    - (a) Primary Bodily Injury with limits of at least \$500,000 per person, \$1,000,000 per occurrence; and
    - (b) Primary Property Damage of at least \$250,000 per occurrence; or
    - (c) Combined single limits of \$1,000,000 per occurrence.
  - (2) General Liability including coverage for premises, products and completed operations, independent contractors, personal injury and contractual obligations with combined single limits of coverage of at least \$2,000,000 per occurrence.
  - (3) Workers' Compensation with limits as required by the State of California and Employers Liability with limits of at least \$1,000,000.
- B. The insurance provided by CONTRACTOR will be primary and non-contributory.
- C. The CITY of Torrance, the City Council and each member thereof, members of boards and commissions, every officer, agent, official, employee and volunteer must be named as additional insureds under the automobile and general liability policies.
- D. CONTRACTOR must provide certificates of insurance and/or endorsements to the City Clerk of the City of Torrance before the commencement of work.
- E. Each insurance policy required by this Paragraph must contain a provision that no termination, cancellation or change of coverage can be made without thirty days notice to the CITY.
- F. CONTRACTOR must include all subcontractors as insured under its policies or must furnish separate certificates and endorsements for each subcontractor. All coverage for subcontractors will be subject to all of the requirements of this Paragraph 17.

## **18. SUFFICIENCY OF INSURERS**

Insurance required by this Agreement will be satisfactory only if issued by companies admitted to do business in California, rated "B+" or better in the most recent edition of Best's Key Rating Guide, and only if they are of a financial category Class VII or better, unless these requirements are waived by the Risk Manager of the CITY ("Risk Manager") due to unique circumstances. In the event the Risk Manager determines that

the work or services to be performed under this Agreement creates an increased or decreased risk of loss to the CITY, the CONTRACTOR agrees that the minimum limits of any insurance policies and/or the performance bond required by this Agreement may be changed accordingly upon receipt of written notice from the Risk Manager; provided that CONTRACTOR will have the right to appeal a determination of increased coverage by the Risk Manager to the City Council of the CITY within 10 days of receipt of notice from the Risk Manager.

**19. CONFLICT OF INTEREST**

- A. No officer or employee of the CITY may have any financial interest, direct or indirect, in this Agreement, nor may any officer or employee participate in any decision relating to the Agreement that effects the officer or employee's financial interest or the financial interest of any corporation, partnership or association in which the officer or employee is, directly or indirectly interested, in violation of any law, rule or regulation.
- B. No person may offer, give, or agree to give any officer or employee or former officer or employee, nor may any officer or employee solicit, demand, accept, or agree to accept from another person, a gratuity or an offer of employment in connection with any decision, approval, disapproval, recommendation, preparation or any part of a program requirement or a purchase request, influencing the content of any specification or procurement standard, rendering of advice, investigation, auditing, or in any other advisory capacity in any way pertaining to any program requirement, contract or subcontract, or to any solicitation or proposal.

**20. NOTICE**

- A. All notices, requests, demands, or other communications under this Agreement will be in writing. Notice will be sufficiently given for all purposes as follows:
  - (1) Personal delivery. When personally delivered to the recipient: notice is effective on delivery.
  - (2) First Class mail. When mailed first class to the last address of the recipient known to the party giving notice: notice is effective three mail delivery days after deposit in an United States Postal Service office or mailbox.
  - (3) Certified mail. When mailed certified mail, return receipt requested: notice is effective on receipt, if delivery is confirmed by a return receipt.
  - (4) Overnight delivery. When delivered by an overnight delivery service, charges prepaid or charged to the sender's account: notice is effective on delivery, if delivery is confirmed by the delivery service.
  - (5) Facsimile transmission. When sent by fax to the last fax number of the recipient known to the party giving notice: notice is effective on receipt. Any notice given by fax will be deemed received on the next business day if it is received after 5:00 p.m. (recipient's time) or on a non-business day.

Addresses for purpose of giving notice are as follows:

CONTRACTOR:	Company Name Address Address  Fax
CITY:	City Clerk City of Torrance 3031 Torrance Boulevard Torrance, CA 90509-2970 Fax: (310) 618-2931

- B. Any correctly addressed notice that is refused, unclaimed, or undeliverable because of an act or omission of the party to be notified, will be deemed effective as of the first date the notice was refused, unclaimed or deemed undeliverable by the postal authorities, messenger or overnight delivery service.
- C. Either party may change its address or fax number by giving the other party notice of the change in any manner permitted by this Agreement.

**21. PROHIBITION AGAINST ASSIGNMENT AND SUBCONTRACTING**

This Agreement and all exhibits are binding on the heirs, successors, and assigns of the parties. The Agreement may not be assigned or subcontracted by either the CITY or CONTRACTOR without the prior written consent of the other.

**22. INTEGRATION; AMENDMENT**

This Agreement represents the entire understanding of the CITY and CONTRACTOR as to those matters contained in it. No prior oral or written understanding will be of any force or effect with respect to the terms of this Agreement. The Agreement may not be modified or altered except in writing signed by both parties.

**23. INTERPRETATION**

The terms of this Agreement should be construed in accordance with the meaning of the language used and should not be construed for or against either party by reason of the authorship of this Agreement or any other rule of construction that might otherwise apply.

**24. SEVERABILITY**

If any part of this Agreement is found to be in conflict with applicable laws, that part will be inoperative, null and void insofar as it is in conflict with any applicable laws, but the remainder of the Agreement will remain in full force and effect.

**25. TIME OF ESSENCE**

Time is of the essence in the performance of this Agreement.

**26. GOVERNING LAW; JURISDICTION**

This Agreement will be administered and interpreted under the laws of the State of California. Jurisdiction of any litigation arising from the Agreement will be in Los Angeles County, California.

**27. COMPLIANCE WITH STATUTES AND REGULATIONS**

CONTRACTOR will be knowledgeable of and will comply with all applicable federal, state, county and city statutes, rules, regulations, ordinances and orders.

**28. WAIVER OF BREACH**

No delay or omission in the exercise of any right or remedy by a nondefaulting party on any default will impair the right or remedy or be construed as a waiver. A party's consent or approval of any act by the other party requiring the party's consent or approval will not be deemed to waive or render unnecessary the other party's consent to or approval of any subsequent act. Any waiver by either party of any default must be in writing and will not be a waiver of any other default concerning the same or any other provision of this Agreement.

**29. ATTORNEY'S FEES**

Except as provided for in Paragraph 15, in any dispute, litigation, arbitration, or other proceeding by which one party either seeks to enforce its rights under this Agreement (whether in contract, tort or both) or seeks a declaration of any rights or obligations under this Agreement, the prevailing party will be awarded reasonable attorney's fees, together with any costs and expenses, to resolve the dispute and to enforce any judgment.

**30. EXHIBITS**

All exhibits identified in this Agreement are incorporated into the Agreement by this reference.

**31. CONTRACTOR'S AUTHORITY TO EXECUTE**

The persons executing this Agreement on behalf of the CONTRACTOR warrant that (i) the CONTRACTOR is duly organized and existing; (ii) they are duly authorized to execute this Agreement on behalf of the CONTRACTOR; (iii) by so executing this Agreement, the CONTRACTOR is formally bound to the provisions of this Agreement; and (iv) the entering into this Agreement does not violate any provision of any other Agreement to which the CONTRACTOR is bound.

CITY OF TORRANCE,  
a Municipal Corporation

Company Name  
Type of Entity

\_\_\_\_\_  
Frank Scotto, Mayor

By: \_\_\_\_\_  
Name  
Title

ATTEST:

\_\_\_\_\_  
Sue Herbers, City Clerk

APPROVED AS TO FORM:

JOHN L. FELLOWS III  
City Attorney

By: \_\_\_\_\_

Attachments: Exhibit A: Bid

**EXHIBIT A**

**Bid**

**[To be attached]**

## **PART F**

### **PREVAILING WAGE RATES**

The August 22nd, 2013 issuance of prevailing wage rates by the State of California Department of Industrial Relations was unavailable at the time of printing. To research the applicable prevailing wage rates click on the following link <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>

**PART G**

**PROJECT SPECIFICATIONS**

***Consultant List***

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***Landscape Architect***

**Land Concern**

1750 East Deere Avenue  
Santa Ana, CA 92705  
(949) 250-4822

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***Irrigation Consultant***

**Water Concern**

29829 Santa Margarita Parkway, Suite 200  
Rancho Santa Margarita, CA 92688  
(949) 635-0474

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***Civil Engineer***

**Urban Resources**

23 Mauchly, Suite 110  
Irvine, CA 92618  
(949) 727-9095

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***Structural Engineer***

**ESI/FME, Inc.**

1800 E. 16<sup>th</sup> St., Unit B  
Santa Ana, CA 927401  
(714) 835-2800

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***Geotechnical Consultant***

**Petra Geotechnical, Inc.**

25050 Avenue Kearney, Suite 110A  
Santa Clarita, CA 91355  
(661) 255-5790

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***Lighting Consultant***

**Visual Concepts, Inc.**

7343 Ronson Road, Suite C  
San Diego, CA 92111  
(858) 278-4503

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***Agronomist***

**Soil and Plant Laboratory**

4741 Hunter Avenue, Suite A  
Anaheim, CA 92807  
(714) 282-8777

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***Utilities Consultant***

**Koser Consulting, LLC**

31805 Temecula Pkwy., #737  
Temecula, CA 92592  
(951) 514-5220

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**555 Maple Ave.**  
**Torrance, California**

**Division 0 – General Requirements**

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**Division 1 – General Requirements**

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- 01310 Project Management and Coordination
- 01320 Construction Progress Documentation
- 01330 Submittal Procedures
- 01400 Quality Requirements
- 01420 References
- 01500 Temporary Facilities and Controls
- 01600 Product Requirements
- Form: Substitute Request
- 01700 Execution Requirements
- 01731 Cutting and Patching
- 01770 Closeout Procedures

**Division 2 – Site Work**

- 02010 Subsurface Exploration
- 02200 Site Preparation
- 02230 Site Clearing
- 02300 Earthwork
- 02630 Storm Drainage
- 02751 Cement Concrete Paving
- 02810 Irrigation
- 02900 Exterior Planting
- 02935 Maintenance of Planting

**Division 3 –Concrete**

- 03350 Pre-Cast Concrete Building

**Division 4 –Masonry**

- 04420 Concrete Unit Masonry

**Division 5 –Metal**

- 05500 Metal Fabrications
- 05560 Misc. Metal Work

SECTION 01050 - FIELD ENGINEERING  
PART 1 - GENERAL

1.01 SUMMARY

- A. Provide materials, labor, and equipment necessary for the completion of field engineering as indicated on the drawings and specified herein.

1.02 GENERAL

- A. Project Record Documents: Submit a record of Work performed and record survey data required under provisions of Sections "Submittals" and "Project Closeout".
- B. Surveyor: Engage a Land Surveyor registered in the State where the Project is located, to perform land surveying required.
- C. Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks before proceeding to layout the Work. Protect existing benchmarks and control points. Preserve permanent reference points during construction.
  - 1. Do not change or relocate benchmarks or control points without prior written approval. Report lost or destroyed reference points, or requirements to relocate reference points because of necessary changes in grades or locations.
  - 2. Promptly replace lost or destroyed project control points. Base replacements on the original survey control points.
- D. Existing Utilities and Equipment: The existence and location of underground utilities and construction indicated as existing are not guaranteed. Before beginning site work, verify the existence and location of underground utilities and other construction.
  - 1. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer and water service piping.
- E. Performance: Working from lines and levels established by the property survey, establish benchmarks and markers to set lines and levels where needed to properly locate each element. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.
  - 1. Advise entities engaged in construction activities, of marked lines and levels provided for their use. As construction proceeds, check every major element for line, level and plumb.
- F. Surveyor's Log: Maintain a surveyor's log of control and other surveys. Make this log available for reference.
  - 1. Record deviations from required lines and levels. Advise the Landscape Architect when deviations that exceed indicated or recognized tolerances are detected. On record Drawings, record deviations that are accepted and not corrected.
- G. Site Improvements: Locate and layout site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes and invert elevations by instrumentation and similar appropriate means.

- H. Existing Utilities: Furnish information necessary to adjust, move or relocate existing structures, utility poles, lines, services or other appurtenances located in, or affected by construction. Coordinate with local authorities having jurisdiction.
- I. Final Property Survey: Before Substantial Completion, prepare a final property survey showing significant features for the Project. Include a certification, signed by the Surveyor, to the effect that metes, bounds, lines and levels of the Project are accurately positioned as shown on the survey.
  - 1. Recording: At Substantial Completion, have the final survey recorded by or with local authorities as the official "property survey".

END OF SECTION

SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. General Project coordination procedures.
  - 2. Coordination Drawings.
  - 3. Project meetings.
- B. See Division 1 Section "Summary of Multiple Contracts" for a description of the division of Work among separate contracts and responsibility for coordination activities not in this Section.
- C. See Division 1 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

1.2 COORDINATION

- A. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, which depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of Contractor's Construction Schedule.
  - 2. Preparation of the Schedule of Values.
  - 3. Installation and removal of temporary facilities and controls.
  - 4. Delivery and processing of submittals.
  - 5. Progress meetings.
  - 6. Pre-installation conferences.
  - 7. Project closeout activities.

1.3 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
1. Indicate relationship of components shown on separate Shop Drawings.
  2. Indicate required installation sequences.
  3. See Division 15 Section "Basic Mechanical Materials and Methods" for specific Coordination Drawing requirements for mechanical installations.
  4. See Division 16 Section "Basic Electrical Materials and Methods" for specific Coordination Drawing requirements for electrical installations.

1.4 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Landscape Architect of scheduled meeting dates and times.
  2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Landscape Architect, within 3 days of the meeting.
- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Landscape Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
1. Attendees: Authorized representatives of Owner, Landscape Architect, and their consultants;  
Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule.
      - b. Phasing.
      - c. Critical work sequencing.
      - d. Designation of responsible personnel.
      - e. Procedures for processing field decisions and Change Orders.
      - f. Procedures for processing Applications for Payment.
      - g. Distribution of the Contract Documents.
      - h. Submittal procedures.
      - i. Preparation of Record Documents.
      - j. Use of the premises.
      - k. Responsibility for temporary facilities and controls.
      - l. Parking availability.
      - m. Office, work, and storage areas.
      - n. Equipment deliveries and priorities.

- o. First aid.
- p. Security.
- q. Progress cleaning.
- r. Working hours.

- C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination Or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Landscape Architect of scheduled meeting dates.
  2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related Change Orders.
    - d. Purchases.
    - e. Deliveries.
    - f. Submittals.
    - g. Review of mockups.
    - h. Possible conflicts.
    - i. Compatibility problems.
    - j. Time schedules.
    - k. Weather limitations.
    - l. Manufacturer's written recommendations.
    - m. Warranty requirements.
    - n. Compatibility of materials.
    - o. Acceptability of substrates.
    - p. Temporary facilities and controls.
    - q. Space and access limitations.
    - r. Regulations of authorities having jurisdiction.
    - s. Testing and inspecting requirements.
    - t. Required performance results.
    - u. Protection of construction and personnel.
  3. Record significant conference discussions, agreements, and disagreements.
  4. Do not proceed with installation if the conference cannot be successfully concluded.

Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

- D. Progress Meetings: Conduct progress meetings at weekly intervals. Coordinate dates of meetings with preparation of payment requests. Prepare and distribute minutes of meeting to record all discussions and actions.
1. Attendees: In addition to representatives of Owner and Landscape Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented as required at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

- a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
  - b. Review present and future needs of each entity present, including the following:
    - 1) Interface requirements.
    - 2) Sequence of operations.
    - 3) Status of submittals.
    - 4) Deliveries.
    - 5) Off-site fabrication.
    - 6) Access.
    - 7) Site utilization.
    - 8) Temporary facilities and controls.
    - 9) Work hours.
    - 10) Hazards and risks.
    - 11) Progress cleaning.
    - 12) Quality and work standards.
    - 13) Change Orders.
    - 14) Documentation of information for payment requests.
3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
    - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01320 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
1. Contractor's Construction Schedule.
  2. Submittals Schedule.
  3. Daily construction reports.
  4. Field condition reports.
  5. Construction photographs
- B. See Division 1 Section "Payment Procedures" for submitting the Schedule of Values.
- C. See Division 1 Section "Closeout Procedures" for submitting photographic negatives as Project Record Documents at Project closeout.

1.2 DEFINITIONS

- A. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- B. Float: The measure of leeway in starting and completing an activity.
1. Float time belongs to Owner
- C. Fragment: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- D. Major Area: A significant construction element.
- E. Milestone: A significant event on the Critical Path.

1.3 SUBMITTALS

- A. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:
1. Scheduled date for first submittal.
  2. Specification Section number and title.
  3. Submittal category (action or informational).
  4. Name of subcontractor.
  5. Description of the Work covered.
  6. Scheduled date for Landscape Architect's final release or approval.
- B. CPM Reports: Concurrent with CPM schedule, submit three printed copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, original duration, actual start, actual completion, remaining duration, early start date, early finish date, late start date, late finish date, and total float.
1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
  2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
  3. Total Float Report: List of all activities sorted in ascending order of total float.

- C. Construction Photographs: Submit digital (jpeg format) of each photographic view within day of taking photographs.
- D. Daily Construction Reports: Submit two copies at monthly intervals.
- E. Field Condition Reports: Submit two copies at time of discovery of differing conditions.

#### 1.4 QUALITY ASSURANCE

- A. Photographer Qualifications: Photographs shall be in digital format and good quality to convey desired information and be capable of electronic distribution

#### 1.5 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
  - 1. Secure time commitments for performing critical elements of the Work from parties involved.
  - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.
- C. Auxiliary Services: Cooperate with photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities including temporary lighting.

### PART 2 - PRODUCTS

#### 2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, re-submittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
  - 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
  - 2. Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

#### 2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to proceed to date of Final Completion.
  - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Landscape Architect.
  2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
    - a. Transformers and Switchgear
    - b. Light Fixtures
    - c. Stone
    - d. Paving Material
  3. Submittal Review Time: Include review and re-submittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
  4. Startup and Testing Time: Include not less than 3 days for startup and testing.
  5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Landscape Architect's administrative procedures necessary for certification of Substantial Completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
  2. Work under More Than One Contract: Include a separate activity for each contract.
  3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
  4. Work Restrictions: Show the effect on the schedule of the following:
    - a. Coordination with existing construction.
    - b. Limitations of continued occupancies.
    - c. Uninterruptible services.
    - d. Use of premises restrictions.
    - e. Provisions for future construction.
    - f. Seasonal variations.
    - g. Environmental control.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Building Dry-In, Conditioned Air, Substantial Completion, and Final Completion.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragments to demonstrate the effect of the proposed change on the overall project schedule.
- 2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)
- A. General: Prepare network diagrams using AON (activity-an-node) format.
  - B. Preliminary Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
  - C. CPM Schedule: Prepare Contractor's Construction Schedule using a CPM network analysis diagram.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice of Award.
  2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
  3. Use "one workday" as the unit of time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following:
    - a. Preparation and processing of submittals.
    - b. Purchase of materials.
    - c. Delivery.
    - d. Fabrication.
    - e. Installation.
  2. Processing: Process data to produce output data or a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
  3. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
    - a. Sub-networks on separate sheets are permissible for activities clearly off the critical path.
- E. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
  2. Description of activity.
  3. Principal events of activity.
  4. Immediate preceding and succeeding activities.
  5. Early and late start dates.
  6. Early and late finish dates.
  7. Activity duration in workdays.
  8. Total float or slack time.
  - g. Average size of workforce.
- F. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
  2. Changes in early and late start dates.
  3. Changes in early and late finish dates.
  4. Changes in activity durations in workdays.
  5. Changes in the critical path.
  6. Changes in total float or slack time.
  7. Changes in the Contract Time.
- G. Look-Ahead Schedule
1. Deliver at each weekly Progress Meeting a schedule projecting three weeks into the future and listing all activities to be constructed during that period. This schedule is to

include those activities which were scheduled to be but not completed during the previous reporting period.

## 2.4 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report, to be forwarded to the Owner and Landscape Architect on a weekly basis, recording events at Project site, including the following:
1. List of subcontractors.
  2. High and low temperatures and general weather conditions.
  3. Accidents.
  4. Stoppages, delays, shortages, and losses.
  5. Meter readings and similar recordings.
  6. Orders and requests of authorities having jurisdiction.
  7. Services connected and disconnected.
  8. Equipment or system tests and startups.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information on CSI Form 13.2A Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

## PART 3 - EXECUTION

### 3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule three days before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  3. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Landscape Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
  2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

### 3.2 CONSTRUCTION PHOTOGRAPHS

- A. Photographer: Photographs shall be in digital format and of good quality as to convey desired information. Photographs are to be taken at a minimum of weekly intervals.

END OF SECTION

## SECTION 01330 - SUBMITTAL PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.
- B. See Division 1 Section “Construction Progress Documentation” for submitting schedules and reports, including Contractor’s Construction Schedule and the Submittals Schedule and construction photographs.
- C. See Division 1 Section “Quality Requirements” for submitting test and inspection reports and Delegated-Design Submittals and for erecting mockups.
- D. See Division 1 Section “Closeout Procedures” for submitting warranties Project Record Documents and operation and maintenance manuals.

#### 1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Landscape Architect’s responsive action.
- B. Informational Submittals: Written information that does not require Landscape Architect’s approval. Submittals may be rejected for not complying with requirements.

#### 1.3 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
- a. Landscape Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- B. Submittals Schedule: Comply with requirements in Division 1 Section “Construction Progress Documentation” for list of submittals and time requirements for scheduled performance of related construction activities.
- C. Processing Time: Allow enough time for submittal review, including time for re-submittals, as follows. Time for review shall commence on Landscape Architect’s receipt of submittal.
  - 1. Initial Review: Allow 5 days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Landscape Architect will advise Contractor when a submittal being processed must be delayed for coordination.
  - 2. If intermediate submittal is necessary, process it in same manner as initial submittal.

3. Allow 5 days for processing each re-submittal.
  4. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- D. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
  2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Landscape Architect.
  3. Include the following information on label for processing and recording action taken:
    - a. Project name.
    - b. Date.
    - c. Name and address of Landscape Architect.
    - d. Name and address of Contractor.
    - e. Name and address of subcontractor.
    - f. Name and address of supplier.
    - g. Name of manufacturer.
    - h. Unique identifier, including revision number.
    - i. Number and title of appropriate Specification Section.
    - j. Drawing number and detail references, as appropriate.
    - k. Other necessary identification.
- E. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
- F. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Landscape Architect will return submittals, without review if received from sources other than Contractor.
1. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
  2. Transmittal Form: Use AIA Document G810
- G. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- H. Use for Construction: Use only final submittals with mark indicating action taken by Landscape Architect in connection with construction.

## PART 2 - PRODUCTS

### 2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
1. Number of Copies: Submit 1 reproducible and two blue-line copies of each submittal, unless otherwise indicated. Landscape Architect will return reproducible and 1 blue-line copy. Mark up and retain one returned copy as a Project Record Document.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
  2. Mark each copy of each submittal to show which products and options are applicable.
  3. Include the following information, as applicable:
    - a. Manufacturer's written recommendations.
    - b. Manufacturer's product specifications.
    - c. Manufacturer's installation instructions.
    - d. Manufacturer's catalog cuts.
    - e. Wiring diagrams showing factory-installed wiring.
    - f. Printed performance curves.
    - g. Operational range diagrams.
    - h. Compliance with recognized trade association standards.
    - i. Compliance with recognized testing agency standards.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Include the following information, as applicable:
    - a. Dimensions.
    - b. Identification of products.
    - c. Fabrication and installation Drawings.
    - d. Roughing-in and setting diagrams.
    - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
    - f. Shop work manufacturing instructions.
    - g. Templates and patterns.
    - h. Schedules.
    - i. Notation of coordination requirements.
    - j. Notation of dimensions established by field measurement.
  2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
  3. Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8 1/2 x 11 inches but no larger than 30x42 inches
- D. Coordination Drawings: Comply with requirements in Division 1 Section "Project Management and Coordination."
- E. Samples: Prepare physical units of materials or products, including the following:
1. Comply with requirements in Division 1 Section "Quality Requirements" for mockups.
  2. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
    - a. Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line.  
Landscape Architect will return submittal with options selected.
  3. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, partial sections of manufactured or fabricated components; small cuts or containers of

materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

- a. Submit three sets of Samples. Landscape Architect will retain two Sample sets; remainder will be returned.
  4. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Landscape Architect's sample where so indicated. Attach label on unexposed side.
  5. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
  6. Disposition: Maintain sets of approved Samples at Project site, available for quality control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
- F. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location.
- G. Delegated-Design Submittal: Comply with requirements in Division 1 Section "Quality Requirements."
- H. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."
- I. Application for Payment: Comply with requirements in Division 1 Section "Payment Procedures."
- J. Schedule of Values: Comply with requirements in Division 1 Section "Payment Procedures."
- K. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design.

## 2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Landscape Architect will not return copies.
  2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
  3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."
- B. Contractor's Construction Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."
- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of Landscape Architects and owners, and other information specified.

- D. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.
- E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project
- G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
- H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.
- I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- J. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- K. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.
- L. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- M. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.
- N. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Division 1 Section "Closeout Procedures."
- O. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- P. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.
- Q. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections.
- R. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

- S. Construction Photographs: Comply with requirements in Division 1 Section "Construction Progress Documentation."

### PART 3 - EXECUTION

#### 3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Landscape Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

#### 3.2 LANDSCAPE ARCHITECTS ACTION

- A. General: Landscape Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
1. Action Submittals: Landscape Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Landscape Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.
  2. The process of review of the Contractors submittals is not for the purpose of testing the Landscape Architect's perception. If deviations, discrepancies or conflicts between the submittals and the Contract Documents are discovered, either prior to or after the submittals are processed by the Landscape Architect, the Contractor agrees that the Contract Documents shall control and be followed.
- B. Informational Submittals: Landscape Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Landscape Architect will forward each submittal to appropriate party.
- C. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION

## SECTION 01400 - QUALITY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
  - 2. Requirements for Contractor to provide quality-control services required by Landscape Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. See Divisions 2 through 16 Sections for specific test and inspection requirements.

#### 1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Landscape Architect.
- C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups establish the standard by which the Work will be judged.
- D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

#### 1.3 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Landscape Architect.

#### 1.4 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.
- C. Reports: Prepare and submit certified written reports that include the following:
1. Date of issue.
  2. Project title and number.
  3. Name, address, and telephone number of testing agency.
  4. Dates and locations of samples and tests or inspections.
  5. Names of individuals making tests and inspections.
  6. Description of the Work and test and inspection method.
  7. Identification of product and Specification Section.
  8. Complete test or inspection data.
  9. Test and inspection results and an interpretation of test results.
  10. Ambient conditions at time of sample taking and testing and inspecting.
  11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  12. Name and signature of laboratory inspector.
  13. Recommendations on retesting and re-inspecting.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

#### 1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.
- G. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.
- H. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Landscape Architect.
  2. Notify Landscape Architect seven days in advance of dates and times when mockups will be constructed.
  3. Demonstrate the proposed range of aesthetic effects and workmanship.
  4. Obtain Landscape Architect's approval of mockups before starting work, fabrication, or construction.
  5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  6. Demolish and remove mockups when directed, unless otherwise indicated.

#### 1.6 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
  2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    - a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.
  2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
  3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Special Tests and Inspections: Owner will engage a testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.

1. Testing agency will notify Landscape Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  2. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to Landscape Architect with copy to Contractor and to authorities having jurisdiction.
  3. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
  4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
  5. Testing agency will retest and re-inspect corrected work.
- D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.
- E. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with Landscape Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Landscape Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
  5. Do not perform any duties of Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
  2. Incidental labor and facilities necessary to facilitate tests and inspections.
  3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  4. Facilities for storage and field-curing of test samples.
  5. Delivery of samples to testing agencies.
  6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  7. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  - 1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
  - 2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01420 - REFERENCES

A. PART - GENERAL

1. DEFINITIONS

- A. General: Basic Contract definitions are included in the General Conditions of the Contract for Construction.
- B. "Approved": The term "approved," when used to convey Landscape Architect's action on Contractor's submittals, applications, and requests, is limited to Landscape Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Landscape Architect, requested by Landscape Architect, and similar phrases.
- D. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on Drawings or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": The term "furnish" means to supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": The term "install" describes operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer": An installer is the Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
- J. The term "experienced," when used with an entity, means having successfully completed a minimum of nine previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- K. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- L. "Project site" is the space available for performing construction activities. The extent of Project site is shown on Drawings and may not be identical with the description of the land on which Project is to be built.

2. INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards *have* the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Landscape Architect for a decision before proceeding.
  - a. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Landscape Architect for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  - a. Where copies of standards are needed to perform a required construction *activity*, obtain copies directly from publication source and make them available on request.
- E. Abbreviations and Acronyms for Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."
  - a. Abbreviations and Acronyms for Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ACI: American Concrete Institute, Box 19150, Redford Station, Detroit, MI 48219.

AISC: American Institute of Steel Construction, Inc., 400 North Michigan Avenue, Chicago, IL 60611.

ANSI: American National Standards Institute, 1430 Broadway, New York, NY 10018.

ASTM: American Society for Testing and Materials, 1916 Race Street, Philadelphia PA 19103.

FM: Factory Mutual Engineering and Research, 1151 Boston-Providence Turnpike, Norwood, MA 02062.

HI: Hydronics Institute, 35 Russo Place, Berkeley Heights, NJ 07922.

ICBO: International Congress of Building Officials, 5360 South Workman Mill Road, Whittier, CA 90601.

IES: Illuminating Engineering Society of North America, 345 East 47<sup>th</sup> Street, New York, NY 10017.

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555 Maple Ave.  
Torrance, CA

NFPA: National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

TCA: Tile Council of America, 100 Clemson Research Boulevard, Anderson, SC 29625

UL: Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062.

WCLB: West Coast Lumber Inspection Bureau, Southwest Varns Street, Portland, OR 97223.

WIC: Woodwork Institute of California, 3164 Industrial Boulevard, PO Box 980247, West Sacramento,  
CA 95798

WWPA: Western Wood Products Association, 1500 Yeon Building, Portland, OR 97204.

PART 2 - PRODUCTS  
NOT USED

PART 3 - EXECUTION  
NOT USED

END OF SECTION

## SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.

#### 1.2 USE CHARGES

- A. General: Cost or use charges for temporary facilities are not chargeable to Owner or Landscape Architect and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces occupants of Project Landscape Architect testing and inspecting agencies and personnel of authorities having jurisdiction.
- B. Water Service: Provide temporary water and any related piping for site work until such time as meter is set.
- C. Electric Power Service: Provide temporary lighting, power distribution and metering for Work of this contract. Use of Owner's electrical service will not be permitted without Owner's written permission.

#### 1.3 SUBMITTALS

- A. Temporary Utility Reports: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

#### 1.4 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA241.
1. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

#### 1.5 PROJECT CONDITIONS

- A. Temporary Utilities: Change over from use of temporary service to use of permanent service, upon written notice and approval from Owner.
1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:

1. Keep temporary services and facilities clean and neat.
2. Relocate temporary services and facilities as required by progress of the Work.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Landscape Architect. Provide materials suitable for use intended, or as required by local agency or regulations having jurisdiction
- B. Pavement: Comply with Division 2 pavement Sections.
- C. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.
- D. Water: Potable.

### 2.2 EQUIPMENT

- A. Field Offices: Prefabricated, mobile units, or job-built construction with lockable entrances, operable windows, and serviceable finishes; heated and air conditioned; on foundations adequate for normal loading.
- B. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
  1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- C. Self-Contained Toilet Units: Single-occupant units of chemical, aerated re-circulation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material. Use of new toilet facilities may not be used without written permission of Owner.
- D. Drinking-Water Fixtures: Drinking-water fountains Containerized, tap-dispenser, bottled water, drinking-water units, including paper cup supply.
  1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F. Revise first paragraph and subparagraphs below to suit Project. Liquid-propane-gas or fuel-oil heaters are commonly used. Steam or hot water heaters, gas-fired space heaters, or electric unit heaters are also used.
- E. Heating Equipment: Unless Owner authorizes use of permanent heating system; provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
  1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  2. Heating Units: Listed and labeled, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use for type of fuel being consumed.
- F. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.

- G. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

#### 3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage appropriate local utility company to install temporary service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
  2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
  3. Obtain easements to bring temporary utilities to Project site where Owner's easements cannot be used for that purpose.
- B. Sewers and Drainage: Provide temporary connections to remove effluent that can be discharged lawfully.
1. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
  2. Connect temporary sewers to municipal system as directed by sewer department officials.
  3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.
  4. Provide temporary filter beds, settlement tanks, separators, and similar devices to purify effluent to levels acceptable to authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction until permanent water service is in use. Sterilize temporary water piping before use.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
  2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy.
  3. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel who handle materials that require wash up. Dispose of drainage properly. Supply cleaning compounds appropriate for each type of material handled.
    - a. Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel.

4. Drinking-Water Facilities: Provide bottled-water, drinking-water units.
  - a. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F.
- E. Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.
- F. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.
  1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions.
  1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
  2. Provide one 100-W incandescent lamp per 500 sq. ft. uniformly distributed, for general lighting, or equivalent illumination.
  3. Provide one 100-W incandescent lamp every 50 feet in traffic areas.
  4. Provide one 100-W incandescent lamp per story in stairways and ladder runs, located to illuminate each landing and flight.
  5. Install exterior-yard site lighting that will provide adequate illumination for construction operations, traffic conditions, and signage visibility when the Work is being performed.
- H. Telephone Service:
  1. Provide additional telephone lines for the following:
  2. At each telephone, post a list of important telephone numbers, including police and fire departments ambulance service, Contractor's home office, Landscape Architect's office, Engineers' offices, Owner's office, and principal subcontractors' field and home offices.
  3. Provide an answering machine on superintendent's telephone.
  4. Provide a portable cellular telephone for superintendent's use in making and receiving telephone calls when away from field office.

### 3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
  1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
  2. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with NFPA 241.
  3. Maintain support facilities until Substantial Completion. Remove upon Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate to support loads and to withstand exposure to traffic during construction period. Locate temporary

roads and paved areas in same location as permanent roads and paved areas. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations. Coordinate temporary roads and paved area with local Fire Department and other agencies having jurisdiction.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
  2. Prepare sub-grade and install sub-base and base for temporary roads and paved areas according to Division 2 Section "Earthwork."
  3. Recondition base after temporary use, including removing contaminated material, re-grading, proof-rolling, compacting, and testing.
  4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Division 2 Section "Hot-Mix Asphalt Paving."
- C. Dewatering Facilities and Drains: Comply with requirements in applicable Division 2 Sections for temporary Drainage and dewatering facilities and operations not directly associated with construction activities included in individual Sections. Where feasible, use same facilities. Maintain Project site, excavations, and construction free of water.
- D. Project Identification and Temporary Signs: Prepare Project identification and other signs in sizes indicated. Install signs where indicated to inform public and persons seeking entrance to Project. Do not permit installation of unauthorized signs.
1. Engage an experienced sign painter to apply graphics for Project identification signs. Comply with details indicated.
  2. Prepare temporary signs to provide directional information to construction personnel and visitors.
- E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste. Comply with Division 1 Section "Execution Requirements" for progress cleaning requirements.
1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.
  2. Develop a waste management plan for Work performed on Project. Indicate types of waste materials Project will produce and estimate quantities of each type. Provide detailed information for on-site waste storage and separation of recyclable materials. Provide information on destination of each type of waste material and means to be used to dispose of all waste materials.
- F. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility services. Sheds may be open shelters or fully enclosed spaces within building or elsewhere on-site.
1. Construct framing, sheathing, and siding using fire-retardant-treated lumber and plywood.
- G. Lifts and Hoists: Provide facilities for hoisting materials and personnel. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

### 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.
- B. Storm water Control: Provide earthen embankments and similar barriers in and around excavations and sub-grade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.
- C. Tree and Plant Protection: When indicated on contract Drawings, install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from construction damage. Protect tree root systems from damage, flooding, and erosion.
- D. Pest Control: Before deep foundation work has been completed, retain a local exterminator or pest-control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Engage this pest-control service to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Obtain extended warranty for Owner. Perform control operations lawfully, using environmentally safe materials.
- E. Site Enclosure Fence: Before construction operations begin install enclosure fence with lockable entrance gates. Locate where indicated, or enclose entire Project site or portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering site except by entrance gates.
  - 1. Set fence posts in compacted mixture of gravel and earth.
  - 2. Set portable chain-link fence posts in concrete bases.
  - 3. Provide gates in sizes and at locations necessary to accommodate delivery vehicles and other construction operations.
  - 4. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Owner with one set of keys.
- F. Security Enclosure and Lockup: Site security is solely responsibility of Contractor
- G. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.
- H. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather tight enclosure for building exterior.
  - 1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
  - 2. Vertical Openings: Close openings of 25 sq. ft. or less with plywood or similar materials.
  - 3. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
  - 4. Install tarpaulins securely using fire-retardant-treated wood framing and other materials.
- I. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

1. Construct dustproof partitions of not less than nominal 4-inch studs, 5/8-inch gypsum wallboard with joints taped on occupied side, and ½-inch fire-retardant plywood on construction side.
  2. Construct dustproof, floor-to-ceiling partitions of not less than nominal 4-inch studs, 2 layers of 3-mil polyethylene sheets, inside and outside temporary enclosure. Cover floor with 2 layers of 3-mil (polyethylene sheets, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with 3/4-inch fire-retardant plywood.
    - a. Construct a vestibule and airlock at each entrance to temporary enclosure with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
  3. Insulate partitions to provide noise protection to occupied areas.
  4. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
  5. Protect air-handling equipment.
  6. Weather-strip openings.
- J. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
1. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.
    - a. Locate fire extinguishers where convenient and effective for their intended purpose; provide not less than one extinguisher on each floor at or near each usable stairwell.
  2. Store combustible materials in containers in fire-safe locations.
  3. Mainline unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways, and other access routes for firefighting. Prohibit smoking in hazardous fire-exposure areas.
  4. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
  5. Develop and supervise an overall fire-prevention and first-aid fire-protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
  6. Provide hoses for fire protection of sufficient length to reach construction areas. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
  7. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

### 3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
  2. Maintain markers for underground lines. Protect from damage during excavation operations.

- C. Temporary Facility Changeover: Except for using permanent fire protection as soon as available, do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. Materials and facilities that constitute temporary facilities are the property of Contractor. Owner reserves right to take possession of Project identification signs.
  - 2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 1 Section "Closeout Procedures."

END OF SECTION

## SECTION 01600 - PRODUCT REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for selecting products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. See Division 1 Section "Closeout Procedures" for submitting warranties for contract closeout.
- C. See Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.

#### 1.2 DEFINITIONS

- A. Products; Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products; Items identified by manufacturer's product name, including make or model number or other designation, shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.
- D. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
- E. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

#### 1.3 SUBMITTALS

- A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.

1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
  2. Completed List: Within 30 days after date of commencement of the Work, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
  3. Landscape Architect's Action: Landscape Architect will respond in writing to Contractor within 7 days of receipt of completed product list. Landscape Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Landscape Architect's response, or lack of response, does not constitute a waiver of requirement that products comply with the Contract Documents.
- B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Substitution Request Form: Use CSI Form 13.1A
  2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified material or product cannot be provided.
    - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, which will be necessary to accommodate proposed substitution.
    - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
    - d. Product Data, including Drawings and descriptions of products and fabrication and installation procedures.
    - e. Samples, where applicable or requested.
    - f. List of similar installations for completed projects with project names and addresses and names and addresses of Landscape Architects and owners.
    - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
    - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
    - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time.
    - j. Cost information, including a proposal of change, if any, in the Contract Sum.
    - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
    - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
  3. Landscape Architect's Action: If necessary, Landscape Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. Landscape Architect will notify Contractor of acceptance or rejection of proposed substitution within 5 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
    - a. Form of Acceptance: Change Order.
    - b. Use product specified if Landscape Architect cannot make a decision on use of a proposed substitution within time allocated.

- c. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

#### 1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

#### 1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
  - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  - 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
  - 5. Store products to allow for inspection and measurement of quantity or counting of units.
  - 6. Store materials in a manner that will not endanger Project structure.
  - 7. Store products that are subject to damage by the elements, under cover in a weather tight enclosure above ground, with ventilation adequate to prevent condensation.
  - 8. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
  - 9. Protect stored products from damage.

#### 1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
  - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  - 2. Specified Form: Forms are included with the Specifications. Prepare a written document using appropriate form properly executed.
  - 3. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT OPTIONS

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  4. Where products are accompanied by the term "as selected," Landscape Architect will make selection.
  5. Where products are accompanied by the term "match sample," sample to be matched is Landscape Architect's.
  6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
- B. Product Selection Procedures: Procedures for product selection include the following:
1. Product: Where Specification paragraphs or subparagraphs titled "Product" name a single product and manufacturer, provide the product named.
    - a. Substitutions may be considered, unless otherwise indicated.
  2. Manufacturer/Source: Where Specification paragraphs or subparagraphs titled "Manufacturer" or "Source" name single manufacturers or sources, provide a product by the manufacturer or from the source named that complies with requirements.
    - a. Substitutions may be considered, unless otherwise indicated.
  3. Products: Where Specification paragraphs or subparagraphs titled "Products" introduce a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
    - a. Substitutions may be considered, unless otherwise indicated.
  4. Manufacturers: Where Specification paragraphs or subparagraphs titled "Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
    - a. Substitutions may be considered, unless otherwise indicated.
  5. Available Products: Where Specification paragraphs or subparagraphs titled "Available Products" introduce a list of names of both products and manufacturers, provide one of the products listed or another product that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
  6. Available Manufacturers: Where Specification paragraphs or subparagraphs titled "Available Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed or another manufacturer that complies with

requirements. Comply with provisions in “Comparable Products” Article to obtain approval for use of an unnamed product.

7. Basis-of-Design Products: Where Specification paragraphs or subparagraphs titled “Basis-of-Design Product” are included and also introduce or refer to a list of manufacturers’ names, provide either the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in “Comparable Products” Article to obtain approval for use of an unnamed product.
  - a. Substitutions may be considered, unless otherwise indicated.
8. Visual Matching Specification: Where Specifications require matching an established Sample, select a product (and manufacturer) that complies with requirements and matches Landscape Architect’s sample. Landscape Architect’s decision will be final on whether a proposed product matches satisfactorily.
9. If no product available within specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents on “substitutions” for selection of a matching product.
  - g. Visual Selection Specification: Where Specifications include the phrase “as selected from manufacturer’s colors, patterns, textures” or a similar phrase, select a product (and manufacturer) that complies with other specified requirements.
    - a. Standard Range: Where Specifications include the phrase “standard range of colors, patterns, textures” or similar phrase, Landscape Architect will select color, pattern, or texture from manufacturer’s product line that does not include premium items.
    - b. Full Range: Where Specifications include the phrase “full range of colors, patterns, textures” or similar phrase, Landscape Architect will select color, pattern, or texture from manufacturer’s product line that includes both standard and premium items.

## 2.2 PRODUCT SUBSTITUTIONS

- A. Timing: Landscape Architect will consider requests for substitution if received within 14 days prior to bid opening. Requests received after that time may be considered or rejected at discretion of Landscape Architect.
- B. Conditions: Landscape Architect will consider Contractor’s request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Landscape Architect will return requests without action, except to record noncompliance with these requirements:
  1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner’s additional responsibilities may include compensation to Landscape Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
  2. Requested substitution does not require extensive revisions to the Contract Documents.
  3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
  4. Substitution request is fully documented and properly submitted.
  5. Requested substitution will not adversely affect Contractor’s Construction Schedule.
  6. Requested substitution has received necessary approvals of authorities having jurisdiction.

7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.

### 2.3 COMPARABLE PRODUCTS

- A. Where products or manufacturers are specified by name, submit the following, in addition to other required submittals, to obtain approval of an unnamed product:
1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
  2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
  3. Evidence that proposed product provides specified warranty.
  4. List of similar installations for completed projects with project names and addresses and names and addresses of Landscape Architects and owners, if requested.
  5. Samples, if requested.

### PART 3 - EXECUTION (Not Used)

END OF SECTION



## SUBSTITUTION REQUEST (After the Bidding Phase)

Project: \_\_\_\_\_ Substitution Request Number: \_\_\_\_\_  
\_\_\_\_\_  
From: \_\_\_\_\_  
To: \_\_\_\_\_ Date: \_\_\_\_\_  
\_\_\_\_\_  
A/E Project Number: \_\_\_\_\_  
Re: \_\_\_\_\_ Contract For: \_\_\_\_\_

Specification Title: \_\_\_\_\_ Description: \_\_\_\_\_ Copy section title from specification  
Section: \_\_\_\_\_ Page: \_\_\_\_\_ Article/Paragraph: \_\_\_\_\_

Proposed Substitution: \_\_\_\_\_

Manufacturer: \_\_\_\_\_ Address: \_\_\_\_\_ Phone: \_\_\_\_\_

Trade Name: \_\_\_\_\_ Model No.: \_\_\_\_\_

Installer: \_\_\_\_\_ Address: \_\_\_\_\_ Phone: \_\_\_\_\_

History: ☐ New product ☐ 2-5 years old ☒ 5-10 years old ☐ More than 10 years old

Differences between proposed substitution and specified product: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

X ☐ Point-by-point comparative data attached - REQUIRED BY A/E

Reason for not providing specified item: \_\_\_\_\_  
\_\_\_\_\_

Similar Installation:  
Project: \_\_\_\_\_ Architect: \_\_\_\_\_  
Address: \_\_\_\_\_ Owner: \_\_\_\_\_  
\_\_\_\_\_ Date Installed: \_\_\_\_\_

Proposed substitution affects other parts of Work: X ☐ No ☐ Yes; explain \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Savings to Owner for accepting substitution: \_\_\_\_\_ (\$ \_\_\_\_\_).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] \_\_\_\_\_ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ \_\_\_\_\_

# SUBSTITUTION REQUEST (Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: \_\_\_\_\_

Signed by: \_\_\_\_\_

Firm: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

Attachments: \_\_\_\_\_

## A/E's REVIEW AND ACTION

- ☐ Substitution approved - Make submittals in accordance with Specification Section 01330.
- ☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
- ☐ Substitution rejected - Use specified materials.
- ☐ Substitution Request received too late - Use specified materials.

Signed by: \_\_\_\_\_

Date: \_\_\_\_\_

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ \_\_\_\_\_

## SECTION 01700 - EXECUTION REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
1. Construction layout.
  2. Field engineering and surveying.
  3. General installation of products.
  4. Progress cleaning.
  5. Starting and adjusting.
  6. Protection of installed construction.
  7. Correction of the Work.
- B. See Division 1 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

#### 1.2 SUBMITTALS

- A. Certificates: Submit certificate signed by land surveyor or professional engineer certifying that location and elevation of improvements comply with requirements.
- B. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- C. Certified Surveys: Submit two copies signed by land surveyor or professional engineer.
- D. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

#### 1.3 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

### PART 2 - PRODUCTS (Not Used)

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
  1. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  3. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  1. Notify Landscape Architect and Owner not less than two days in advance of proposed utility interruptions.
  2. Do not proceed with utility interruptions without Owner's written permission.
- C. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- E. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Landscape Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Submit requests on CSI Form 13.2A, "Request for Interpretation."

### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to layout the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Landscape Architect promptly.

B. General: Engage a land surveyor or professional engineer to layout the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines of construction and elsewhere as needed to locate each element of Project.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
3. Inform installers of lines and levels to which they must comply.
4. Check the location, level and plumb, of every major element as the Work progresses.
5. Notify Landscape Architect when deviations from required lines and levels exceed allowable tolerances.
6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and layout site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Landscape Architect.

### 3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

B. Benchmarks: Establish and maintain a minimum of two benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

### 3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Landscape Architect.
- F. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- G. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

#### PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
  - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- G. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- H. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

- I. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.7 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

### 3.8 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

### 3.9 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."
  1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION

SECTION 01731 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. See Divisions 2 through 16 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
- C. Requirements in this Section apply to mechanical and electrical installations. See Divisions 15 and 16 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.2 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
  - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
  - 2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
  - 3. Products: List products to be used and firms or entities that will perform the Work.
  - 4. Dates: Indicate when cutting and patching will be performed.
  - 5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List the utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
  - 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
  - 7. Landscape Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.3 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety.
- C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, which results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety.

- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Landscape Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
1. If possible, retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced, and specialized firm.

#### 1.4 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

- D. Existing Services: Where existing services are required to be removed, relocated, or abandoned; bypass such services before cutting to minimize interruption of services to occupied areas.

### 3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  3. Concrete or masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
  5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
  2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

END OF SECTION

## SECTION 01770 - CLOSEOUT PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Inspection procedures.
  - 2. Project Record Documents.
  - 3. Operation and maintenance manuals.
  - 4. Warranties.
  - 5. Instruction of Owner's personnel.
  - 6. Final cleaning.
- B. See Division 1 Section "Payment Procedures" and Owner-Contractor Agreement for requirements for Applications for Payment for Substantial and Final Completion.
- C. See Division 1 Section "Construction Progress Documentation" for submitting Final Completion construction photographs and negatives.
- D. See Divisions 2 through 16 Sections for specific closeout and special cleaning requirements for products of those Sections.

#### 1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
  - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
  - 2. Advise Owner of pending insurance changeover requirements.
  - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs and photographic negatives, damage or settlement surveys, property surveys, and similar final record information.
  - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
  - 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  - 8. Complete startup testing of systems.
  - 9. Submit test/adjust/balance records.
  - 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  - 11. Advise Owner of changeover in utilities.
  - 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
  - 13. Complete final cleaning requirements, including touchup painting.
  - 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Landscape Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Landscape Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Landscape Architect, that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

### 1.3 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
2. Submit certified copy of Landscape Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Landscape Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Landscape Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Landscape Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

### 1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order.
2. Organize items applying to each space by major element.

### 1.5 PROJECT RECORD DOCUMENTS

- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Landscape Architect's reference during normal working hours.

- B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.

1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

- a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
    - b. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
  2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
  3. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
  4. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.
- C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  3. Note related Change Orders and Record Drawings, where applicable.
- D. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

#### 1.6 OPERATION AND MAINTENANCE MANUALS

- A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
1. Operation Data: Include emergency instructions and procedures, system and equipment descriptions, operating procedures, and sequence of operations.
  2. Maintenance Data: Include manufacturer's information, list of spare parts, maintenance procedures, maintenance and service schedules for preventive and routine maintenance, and copies of warranties and bonds.
- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

#### 1.7 WARRANTIES

- A. Submittal Time: Submit written warranties for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11 inch paper.
  2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

## PART 3 - EXECUTION

### 3.1 DEMONSTRATION AND TRAINING

- A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
1. Provide instructors experienced in operation and maintenance procedures.
  2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
  3. Schedule training with Owner, through Landscape Architect, with at least seven days' advance notice.
  4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.
- B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline.
1. Include instruction for system design and operational philosophy, review of documentation, operations, adjustments, troubleshooting, maintenance, and repair.

### 3.2 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Clean exposed exterior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - f. Remove debris and surface dust from limited access spaces, trenches, equipment vaults, manholes, and similar spaces.
    - g. Remove labels that are not permanent.
    - h. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
      - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
    - i. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    - j. Replace parts subject to unusual operating conditions.
    - k. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
    - l. Leave Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.
- D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION

## SECTION 02010 - SUBSURFACE EXPLORATION

Contract drawings, Division 0, Conditions of the Contract, and Division 1, General Requirements, apply to the Work of this Section

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. A soils investigation report has been prepared for the site of this Work.
- B. Availability: The soils investigation report may be inspected at the office of the Landscape Architect, and copies may be obtained from the Soils Engineer at the cost of reproduction and handling upon request accompanied by full payment.
- C. Use of Data: This report was provided only for the Architect's use in design and is not a part of the Contract Documents. The report is available for information, but is not a warranty of subsurface conditions.

#### 1.02 QUALITY ASSURANCE

- A. Soils Engineer will be retained by the Owner to observe performance of work in connection with work included in this Contract.
- B. Adjustment of Work: Readjust all work performed that does not meet technical or design requirements, but make no deviations from the Contract Documents without specific written approval from the Architect.

### PART 2 - PRODUCTS

NOT USED

### PART 3 - EXECUTION

NOT USED

END OF SECTION

## SECTION 02200 – SITE PREPARATION AND EARTHWORK

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes: Division 1 apply to this Section. Provide and perform site preparation and earthwork, complete site clearing, excavation, filling, backfilling, and compaction, over excavation and placement of engineered fill below floor slabs and footings, imported fill material as required, subgrade preparation for on-grade concrete, gravel fill under floor slabs, rough grading in asphaltic concrete paving areas, control of surface and ground water, testing and inspection of work of this section, clean up and disposal.

#### 1.2 QUALITY ASSURANCE

- A. Professional Observation: Required for all work of this Section. The Soils Engineer shall have the following duties:
  - 1. Observe the stripping and clearing of vegetation and deleterious materials.
  - 2. Observe the over excavation to determine that the depth of excavation and bottom of the subgrade are suitable.
  - 3. Observe the exposed subgrade in areas to receive fill and in areas where excavation has resulted in the desired finished subgrade, observe proof rolling, and delineate areas requiring additional excavation.
  - 4. Observe the compaction of scarified soils.
  - 5. Perform visual observation to evaluate the suitability of on-site and imported soils for fill placement; collect and submit soil samples for laboratory testing.
  - 6. Perform field density and compaction testing to determine the percentage of compaction achieved during placement of fills.
  - 7. Observe and probe foundation bearing materials to confirm that suitable bearing materials are present at the design grades.
  - 8. Observe the backfill of utility trenches.
  - 9. Observe the construction of the subgrade and base for exterior paving.
- B. Preconstruction Conference: Contractor shall conduct a preconstruction conference prior to starting work of this section, to develop a program for quality control of the work. The requirements for observation of the work by the Soils Engineer, scheduling of the work to be observed, any additional observation requirements, and planned construction procedures, will be discussed. Minutes of the conference shall be kept, and copies distributed, with an additional copy to the Soils Engineer.
- C. Source Quality Control: Obtain approval by the Soils Engineer of imported fill material before material is brought to site, and same approval of excavated material for use in fills or backfills prior to placing. Imported material shall be tested for toxic substances by an independent testing laboratory approved by the University.

#### 1.3 SUBMITTALS

- A. Provide certification, signed by an authorized representative of an approved testing laboratory, that proposed imported fill material and other earthwork materials to be brought to the site, are free from toxic substances, and are in conformance with applicable state and local regulations.

#### 1.4 PROJECT SITE CONDITIONS

- A. Protection: Provide and maintain protection to retain earth banks and to protect adjoining grades and structures from caving, sliding, erosion, or other damage. Provide suitable protection against all bodily injury. Construct all bulkheads and shoring to requirements of State and Local codes and regulations. Shore vertical banks or slope banks back as required for stability and safety. Erect temporary barricades located at least 5-feet away from the top of slopes, and provide temporary berms as required to prevent slope erosion from water.
- B. Digital Photographs and Videos: Required prior to starting work of this Section.
- C. Utilities: Perform work adjacent to public utilities in accordance with procedures outlined by the utility company. For work adjacent to the Owner's utility lines, excavate by hand until the utility is uncovered or sufficient clearance is defined for machine work.
- D. Drainage: Collect and dispose of surface and subsurface water encountered in the course of construction.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Provide approved imported material as required if the quantity of approved site and excavated material is insufficient to complete the work.
- B. Earthwork Materials: Approved excavated or imported granular soil such as silty sand having an expansion index of 20 or less, and containing not more than 20 percent by weight of material passing the No. 200 sieve, free from trash, roots, organic material, clay lumps, and rocks over 6" size.
- C. Gravel Fill Material: From approved source, 90 percent to 100 percent passing a 3/4" sieve, 0 percent to 10 percent passing a No. 4 sieve, and 0 percent to 3 percent passing a No. 100 sieve.
- D. Sand: ASTM D2488, with not more than 3 percent passing No. 200 sieve.

### PART 3 - EXECUTION

#### 3.1 COMPACTION CONTROL

- A. Unless otherwise specified hereafter, compaction densities shall be not less than the following. Moisten or aerate material to specified moisture content, then uniformly compact the fills and backfills in maximum 8" thick loose layers to 90 percent of the maximum dry density determined by ASTM D1557. This is the minimum compaction; average shall be at least 92 percent. Flooding or jetting is not allowed. In areas to be landscaped only, fills may be placed in 12" layers and compacted to 85 percent of maximum dry density.

#### 3.2 MOISTURE CONTENT CONTROL

- A. Material to be compacted shall be brought to uniform moisture content varying no more than zero percent below or 3 percent above optimum moisture content. Obtain approval by the Soils Engineer of the

moisture content before performing further grading operations. Mix, dampen, or dry soils as required to achieve specified moisture content.

### 3.3 SITE CLEARING

- A. Coordinate with the Demolition Contractor for the demolition and removal of the existing piles and pile caps, grade beams and asphalt paving and base course from areas to receive the new building as shown on the drawings as indicated. Asphalt paving may be pulverized and blended with site soils to be used for engineered fill material, provided the specified results of compaction and grading are obtained.

### 3.4 REMOVAL AND REPLACEMENT OF UNSUITABLE SOILS

- A. General: As indicated in the soils report, unsuitable soils conditions may be encountered in the area of the building to depth of approximately 6'-0". If any of the following conditions occur, the provisions of this paragraph shall apply.
  - 1. Dissimilar native materials are encountered across the building footprint.
  - 2. Incompetent zones are encountered.
  - 3. The subgrade becomes disturbed during construction.
  - 4. Creation of a level pad requires a cut/fill transition within the building pad.
  - 5. The Soils Engineer determines that field conditions require procedures specified herein.
- B. In the event that any of the above conditions occur, the following procedures shall be performed.
  - 1. After removal of existing paving, remove all uncontrolled fill soils, all upper loose, firm, porous or disturbed natural soils from areas to receive footings, slabs, walks and paving to a distance of 5 feet beyond edges of same.
  - 2. Soils shall be removed to a depth that will provide not less than 2 feet of compacted soil below building slabs and 5 feet beyond, and 18 inches below exterior paving, walks, and new asphalt paving
  - 3. After excavating, the exposed soils shall be inspected to verify removal of all unsuitable deposits. Remove all rocks larger than 8" in largest dimension.
  - 4. The exposed soils shall be scarified to a depth of 6", moisture added as required and recompact to not less than 90 percent of the maximum dry density at optimum moisture content in accordance with ASTM D1557. Fill shall be placed in loose lifts not exceeding 8" in thickness and compacted to 90 percent as defined above. Compaction shall be accomplished continuously over the entire area. Sufficient passes shall be made to ensure that specified density is obtained.

### 3.5 EXCAVATION AND BACKFILLING FOR FOUNDATIONS AND STRUCTURES:

- A. Foundation Soils: Excavate for foundations to sizes indicated, clean, and leave in condition recommended by Geotechnical Investigation Report. Prior to placement of forms, reinforcing, or concrete, obtain approval of Soils Engineer and building department as required, for proper conditions and suitable bearing materials.
- B. Perform excavation to the dimensions and elevations indicated on drawings, with additional space allowed as required for the installation and stripping of forms, and inspection of the various types of work, except where approval may be given to deposit certain miscellaneous concrete directly against earth banks.
- C. Provide lateral support for excavations within and adjacent to structures, foundations and slabs-on-grade to prevent caving, earth movement or loosening of subgrade materials.

- D. Adverse Subsurface Conditions: Notify Project Engineer should unsuitable bearing soil or other adverse subsurface conditions be found which are not indicated by the drawings or specifications.
- E. Unauthorized Excavation: If excavations are carried below the elevations indicated without written authorization, provide satisfactory construction to correct the fault as approved, at no additional contract cost.
- F. Backfill Beside Foundations:
  - 1. Backfilling against concrete shall not be done until concrete has attained its 28-day compressive strength, unless specifically approved otherwise.
  - 2. Moisten or aerate backfill material as required to attain specified moisture content. Place backfill material adjacent to structures and compact in a manner that prevents wedging action or eccentric loading upon or against the structures. Step or serrate slopes bounding or within areas to be backfilled to prevent sliding of the fill. Do not place material on surfaces that are muddy. Do not use equipment for backfilling operations or for the formation of embankments against structures that will overload the structure.

### 3.6 EXCAVATION AND BACKFILLING FOR UTILITIES

- A. Trenching and excavating for underground piping, conduits, and related items are performed under other sections. Conform trenching operations to the following requirements:
  - 1. Trenches: Excavate trenches to widths required for proper laying of pipe, with banks as nearly vertical as practicable. Bring bottoms of trenches to the required depths, all accurately graded to provide uniform bearing on undisturbed soil for entire length of each section of pipe, except where it is necessary to excavate for pipe bells or for pipe bedding specified in other sections.
  - 2. Methods: Machine excavation method may be used down to rough elevations. Perform fine grading and trimming by hand method.
  - 3. Trench Backfilling: Conform to Paragraph "Compaction" except compact all backfill to at least 95 percent of maximum dry density where the trenches are located in paved areas or under building or structures. Take precautions in placing and compaction of backfill to avoid damaging pipes, ducts, conduits, and structures. The upper 12 inches of trench backfill materials shall consist of on-site soil material, compacted as specified.

### 3.7 SUBGRADE PREPARATION FOR CONCRETE

- A. Prepare subgrade for concrete items placed directly on earth by excavating, filling, and grading as required and as specified, and bring to optimum moisture content. Excavate the existing subgrade to a depth of 12 inches, moisture condition, and recompact to 90 percent. Finish the subgrade within 0.10-foot tolerance when tested along a 10-foot straightedge in any direction at any location. Compact to density specified for fills, and maintain moisture content until concrete is placed.

### 3.8 ASPHALTIC CONCRETE PAVING AREAS

- A. Bring areas to required elevations and grades by clearing and preparation, cutting, filling, and grading, as shown and specified herein. Allow for thickness of subsequent materials. Excavate the existing subgrade to a depth of 12 inches, moisture condition, and recompact to 90 percent. Final fine grading and compaction is specified as a part of the paving operations. Coordinate with Section 02510 requirements.

3.9 LANDSCAPE AREAS

- A. Bring to nominal 0.10-foot below required grades except where topsoil fill occurs, and finish with smoothly curving contours at grade changes and slopes, as approved. Grade to allow for thickness of topsoil fill. Avoid excessive compaction in all areas.

3.10 GRADING

- A. After completion of construction, and immediately prior to final acceptance, all surfaces not covered by landscaping, paving, or other materials shall be raked clean and uniformly graded to elevations shown on drawings, with smoothly curving contours.

3.11 DISPOSAL

- A. Clean up and remove all trash, debris, waste, and surplus and rejected earthwork materials from the site to a legal disposal area. Conform to pertaining laws, codes, and regulations, obtain and pay for required hauling and dumping permits, and pay all dumping charges. Perform trucking and material handling in a careful manner to prevent spillage and dusting or damage to surfaces and structures. Remove planks used to protect surfaces subject to public traffic at finish of each day's operations. Maintain public streets and sidewalks in broom clean condition.

3.12 PROTECTION

- A. Protect newly graded areas from traffic, erosion, and settlement. Repair and reestablish damaged or eroded slopes, elevations, or grades and restore surface construction prior to acceptance.

3.13 FIELD QUALITY CONTROL:

- A. Refer to Division 1 for additional requirements, specifically Section 01400.
- B. Testing: Testing Laboratory will take test samples and perform materials, moisture content, compaction densities, and other tests to the extent and by the methods directed by the Soils Engineer.
- C. Professional Certificates: Upon completion, Soils Engineer will furnish written certificates that earthwork and compaction densities conform to requirements herein.

END OF SECTION 02200

SECTION 02230 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Removing existing vegetation.
  - 2. Clearing and grubbing.
  - 3. Stripping and stockpiling topsoil.
  - 4. Temporary erosion- and sedimentation-control measures.
- B. Related Sections:
  - 1. Division 1 Section "Mobilization and Temporary Controls" for temporary utility services, construction and support facilities, security and protection facilities, and temporary erosion- and sedimentation-control measures.
  - 2. Division 1 Section "Field Engineering" for field engineering and surveying.

1.3 DEFINITIONS

- A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.
- D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.
- E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated.
- F. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 MATERIAL OWNERSHIP

- A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 SUBMITTALS

- A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
  - 1. Use sufficiently detailed photographs or videotape.
  - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.6 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.
  - 1. Do not proceed with work on adjoining property until directed by Architect.
- C. Utility Locator Service: Notify utility locator service, Underground Service Alert (DigAlert) or other approved service, for area where Project is located before site clearing.
- D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.
- E. The following practices are prohibited within protection zones:
  - 1. Storage of construction materials, debris, or excavated material.
  - 2. Parking vehicles or equipment.
  - 3. Foot traffic.
  - 4. Erection of sheds or structures.
  - 5. Impoundment of water.
  - 6. Excavation or other digging unless otherwise indicated.
  - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- F. Do not direct vehicle or equipment exhaust towards protection zones.
- G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.
- H. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Division 2 Section "Earthwork."
  - 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Protect existing site improvements to remain from damage during construction.
  - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

### 3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- C. After completion of construction, remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### 3.3 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
  - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
  - 2. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches (450 mm) below exposed subgrade.
  - 3. Use only hand methods for grubbing within protection zones.
  - 4. Chip removed tree branches and stockpile in areas approved by Architect.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
  - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches (200 mm), and compact each layer to a density equal to adjacent original ground.

#### 3.4 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to depth of 6 inches (150 mm) in a manner to prevent intermingling with underlying subsoil or other waste materials.
  - 1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
  - 1. Limit height of topsoil stockpiles to 72 inches (1800 mm).
  - 2. Do not stockpile topsoil within protection zones.
  - 3. Stockpile surplus topsoil to allow for respreading deeper topsoil.

#### 3.5 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
  - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.

#### 3.6 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 02230

## SECTION 02300 - EARTHWORK

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

1. Preparing subgrades for slabs-on-grade.
2. Excavating and backfilling for buildings and structures.
3. Drainage course for concrete slabs-on-grade.
4. Subbase course for concrete slabs.
5. Subbase course and base course for asphalt paving.
6. Subsurface drainage backfill for walls and trenches.
7. Excavating and backfilling trenches for utilities and pits for buried utility structures.
8. Excavating well hole to accommodate elevator-cylinder assembly.

- B. Related Sections:

1. Division 1 Section "Construction Progress Documentation " for recording pre-excavation and earth moving progress.
2. Division 1 Section "Temporary Facilities and Controls" for temporary controls, utilities, and support facilities; also for temporary site fencing if not in another Section.
3. Division 2 Section "Site Clearing" for site stripping, grubbing, stripping topsoil, and removal of above- and below-grade improvements and utilities.
4. Division 2 Section "Dewatering" for lowering and disposing of ground water during construction.
5. Division 2 Section "Excavation Support and Protection" for shoring, bracing, and sheet piling of excavations.
6. Division 2 Section "Drilled Piers" for excavation of shafts and disposal of surplus excavated material.
7. Division 2 Section "Subdrainage" for drainage of landscaped areas.
8. Division 2 Section "Lawns and Grasses" for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.
9. Division 2 Section "Exterior Plants" for finish grading in planting areas and tree and shrub pit excavation and planting.
10. Division 3 Section "Cast-in-Place Concrete" for granular course if placed over vapor retarder and beneath the slab-on-grade.
11. Divisions 2, 15, and 16 Sections for installing underground mechanical and electrical utilities and buried mechanical and electrical structures.
12. Division 14 Section Hydraulic Freight Elevators for excavating well hole to accommodate elevator-cylinder assembly.

#### 1.3 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
  - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
  - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.
- C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
  - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
  - 2. Bulk Excavation: Excavation more than 10 feet (3 m) in width and more than 30 feet (9 m) in length.
  - 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of the following manufactured products required:
  - 1. Warning tapes.
- B. Samples for Verification: For the following products, in sizes indicated below:
  - 1. Warning Tape: 12 inches (300 mm) long; of each color.

- C. Material Test Reports: For each on-site soil material proposed for fill and backfill as follows:
  - 1. Classification according to ASTM D 2487.
  - 2. Laboratory compaction curve according to ASTM D 1557.
- D. Seismic survey report from seismic survey agency.
- E. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth moving operations. Submit before earth moving begins.

#### 1.5 QUALITY ASSURANCE

- A. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.
- B. Seismic Survey Agency: An independent testing agency, acceptable to authorities having jurisdiction, experienced in seismic surveys and blasting procedures to perform the following services:
  - 1. Report types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.
  - 2. Seismographic monitoring during blasting operations.

#### 1.6 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.
  - 1. Do not proceed with work on adjoining property until directed by Architect.
- C. Utility Locator Service: Notify utility locator service, Underground Service Alert (DigAlert) or other approved service, for area where Project is located before beginning earth moving operations.
- D. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures, specified in Division 1-"Temporary Facilities and Division 2 - "Site Clearing," are in place.
- E. Do not commence earth moving operations until plant-protection measures specified in Division 2 Section "Tree Protection and Trimming" are in place.
- F. The following practices are prohibited within protection zones:
  - 1. Storage of construction materials, debris, or excavated material.
  - 2. Parking vehicles or equipment.
  - 3. Foot traffic.

4. Erection of sheds or structures.
  5. Impoundment of water.
  6. Excavation or other digging unless otherwise indicated.
  7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- G. Do not direct vehicle or equipment exhaust towards protection zones.
- H. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

## PART 2 - PRODUCTS

### 2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487 , or a combination of these groups; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
1. Liquid Limit: As specified in the Soils Report.
  2. Plasticity Index: As specified in the Soils Report.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487 , or a combination of these groups.
1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- H. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.
- I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch (25-mm) sieve and 0 to 5 percent passing a No. 4 (4.75-mm) sieve.

- J. Sand: ASTM C 33; fine aggregate.
- K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

## 2.2 ACCESSORIES

- A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as follows:
  - 1. Red: Electric.
  - 2. Yellow: Gas, oil, steam, and dangerous materials.
  - 3. Orange: Telephone and other communications.
  - 4. Blue: Water systems.
  - 5. Green: Sewer systems.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

### 3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
  - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

### 3.3 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
  - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

### 3.4 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
  - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
  - 2. Pile Foundations: Stop excavations 6 to 12 inches (150 to 300 mm) above bottom of pile cap before piles are placed. After piles have been poured, , remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.
  - 3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch (25 mm). Do not disturb bottom of excavations intended as bearing surfaces.
- B. Excavations at Edges of Tree- and Plant-Protection Zones:
  - 1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
  - 2. Cut and protect roots according to requirements in Division 2 Section "Tree Protection and Trimming."

### 3.5 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

### 3.6 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
  - 1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit unless otherwise indicated.
  - 1. Clearance: 12 inches (300 mm) each side of pipe or conduit
- C. Trench Bottoms: Excavate trenches 4 inches (100 mm) deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.
  - 1. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- D. Trenches in Tree- and Plant-Protection Zones:
  - 1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
3. Cut and protect roots according to requirements in Division 2 Section "Tree Protection and Trimming."

### 3.7 EXCAVATION FOR ELEVATOR CYLINDER

- A. Drill well hole plumb in elevator pit to accommodate installation of elevator-cylinder assembly. Coordinate with applicable requirements for diameter and tolerances in Division 14 Section "Hydraulic Freight Elevators."
- B. Provide well casing as necessary to retain walls of well hole.

### 3.8 SUBGRADE INSPECTION

- A. Notify IOR and Soils Engineer when excavations have reached required subgrade.
- B. If IOR and Soils Engineer determine that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Soils Engineer, without additional compensation.

### 3.9 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi (17.2 MPa), may be used when approved by Architect.
  1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

### 3.10 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

### 3.11 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
  1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
  2. Surveying locations of underground utilities for Record Documents.
  3. Testing and inspecting underground utilities.
  4. Removing concrete formwork.
  5. Removing trash and debris.

6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

- B. Place backfill on subgrades free of mud, frost, snow, or ice.

### 3.12 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 3 Section "Cast-in-Place Concrete ."
- D. Trenches under Roadways: Provide 4-inch- (100-mm-)thick, concrete-base slab support for piping or conduit less than 30 inches (750 mm) below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches (100 mm) of concrete before backfilling or placing roadway subbase course. Concrete is specified in Division 3 Cast-in-Place Concrete
- E. Backfill voids with satisfactory soil while removing shoring and bracing.
- F. Place and compact final backfill of satisfactory soil to final subgrade elevation.

### 3.13 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
  1. Under grass and planted areas, use satisfactory soil material.
  2. Under walks and pavements, use satisfactory soil material.
  3. Under steps and ramps, use engineered fill.
  4. Under building slabs, use engineered fill.
  5. Under footings and foundations, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

### 3.14 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
  1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
  2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
  - 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 24 inches (300 mm) of existing subgrade and each layer of backfill or fill soil material at 90 percent.
  - 2. Under walkways, scarify and recompact top 24 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 90 percent.
  - 3. Under turf or unpaved areas, scarify and recompact top 24 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 90 percent.
  - 4. For utility trenches, compact each layer of initial and final backfill soil material at 90 percent.
  - 5. For flexible asphalt concrete pavement for parking, compact aggregate base and asphalt concrete at 95 percent.

3.16 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
  - 1. Provide a smooth transition between adjacent existing grades and new grades.
  - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
  - 1. Turf or Unpaved Areas: Plus or minus 1 inch (25 mm)
  - 2. Walks: Plus or minus 1 inch (25 mm)
  - 3. Pavements: Plus or minus 1/2 inch (13 mm)
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch (13 mm) when tested with a 10-foot (3-m) straightedge.

3.17 SUBSURFACE DRAINAGE

- A. Subdrainage Pipe: Specified in Division 2 Section "Subdrainage."
- B. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches (300 mm) of final subgrade, in compacted layers 6 inches (150 mm) thick. Overlay drainage backfill with one layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches (150 mm).
  - 1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 698.

2. Place and compact impervious fill over drainage backfill in 6-inch- (150-mm-) thick compacted layers to final subgrade.

### 3.18 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
  1. Place base course material over subbase course under hot-mix asphalt pavement.
  2. Shape subbase course and base course to required crown elevations and cross-slope grades.
  3. Place subbase course and base course 6 inches (150 mm) or less in compacted thickness in a single layer.
  4. Place subbase course and base course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.
  5. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 90 percent- of maximum dry unit weight according to ASTM D 1557. For flexible asphalt concrete pavement for parking, compact aggregate base and asphalt concrete at 95 percent.
- C. Pavement Shoulders: Place shoulders along edges of subbase course and base course to prevent lateral movement. Construct shoulders, at least 12 inches (300 mm) wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

### 3.19 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
  1. Place drainage course 6 inches (150 mm) or less in compacted thickness in a single layer.
  2. Place drainage course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.
  3. Compact each layer of drainage course to required cross sections and thicknesses to not less than 90 percent of maximum dry unit weight according to ASTM D 1557.

### 3.20 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
  1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
  2. Determine that fill material and maximum lift thickness comply with requirements.

3. Determine, at the required frequency, that in-place density of compacted fill complies with requirements.
- B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
  1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. (186 sq. m) or less of paved area or building slab, but in no case fewer than three tests.
  2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 75 feet (30 m) or less of wall length, but no fewer than two tests.
  3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet (46 m) or less of trench length, but no fewer than two tests.
- F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

### 3.21 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
  1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
  1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

### 3.22 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

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END OF SECTION 02300

## SECTION 02630 STORM DRAINAGE

### PART 1 - DESCRIPTION

#### 1.01 SCOPE

- A. The Contractor shall provide all labor and equipment necessary and required to install all of the storm drainage facilities in accordance with the Contract Documents. Work shall include, but not be limited to:
  - 1. Installation of drainage system(s) consisting of manholes, drain inlets, catch basins, pipe, end sections, outlet control structure(s), and all necessary and required accessory items and operations, including connection(s) to existing drainage facilities.
  - 2. Installation of building leader drains at building downspouts, where indicated on plans or as described herein, consisting of all pipe, fittings and required accessory items and operations, including connections to the proposed and/or existing drainage system. All downspouts at the front of building within 5'-0" of a sidewalk shall have leader drain connection to the storm piping.
  - 3. Where shown, installation of underdrains consisting of all pipe, fittings and required accessory items and operations, including connections to the proposed and/or existing drainage system.

#### 1.02 WORK SPECIFIED UNDER OTHER SECTIONS

- A. The following related work is specified under other Sections:
  - 1. Division 2: Excavation Support and Protection
  - 2. Division 2: Earthwork
  - 3. Division 2: Cement Concrete Pavement
  - 4. Division 2: Asphalt Concrete Paving

#### 1.03 OTHER REQUIREMENTS

- A. In addition to the requirements specified herein, the Contractor shall comply with the requirements as specified on the Drawings.

### PART 2 - CONSTRUCTION DETAILS

#### 2.01 GENERAL

- A. The Contractor shall install all drainage structures and pipe in the locations shown on the Drawings. Pipe shall be of the type and sizes specified and shall be laid accurately to line and grade. Structures shall be accurately located and properly oriented.
- B. The installation of all drainage structures and pipe shall conform to the requirements of all Authorities having jurisdiction.

2.02 TRENCH EXCAVATION AND BACKFILL

- A. The provisions of the Article of these Specifications entitled "Earthwork" shall govern all work under this Section.

2.03 STORAGE AND HANDLING

- A. Storage - Storage of storm drain pipe and appurtenances on the job shall be in accordance with the manufacturers' recommendations.
- B. Handling - All storm drain pipe and appurtenances shall be protected against impact, shock and free fall, and only equipment of sufficient capacity and proper design shall be used in handling the pipe and appurtenances.

2.04 DAMAGE

- A. General - Pipe and/or appurtenances which are defective from any cause, including damage caused by handling, shall be unacceptable for installation and shall be replaced by the Contractor at no cost to the Owner.

Pipe and/or appurtenances that are damaged or disturbed through any cause prior to acceptance of the Work, shall be repaired, realigned or replaced by the Contractor at the Contractor's expense.

- B. Minor Imperfections in Concrete Pipe - Concrete pipe with damage which is the result of minor imperfections in manufacture which do not affect the structural integrity of the pipe may be repaired in the field. Repairs shall be sound, properly finished and cured and shall conform to the requirements of these Specifications.

2.05 PIPE INSTALLATION

- A. Laying Pipe - Each length of pipe shall be laid with firm, full and even bearing throughout its entire length, in a trench prepared and maintained in accordance with the details as shown on the Drawings and the Article of these Specifications entitled "Trench Excavation and Backfill". Pipe shall be laid upgrade unless otherwise directed by the Owner's Field Representative.

Concrete pipe with lift holes shall be laid with the lift holes on top of the pipe. After the pipe is installed, the lift holes shall be sealed with suitable concrete plugs to the satisfaction of the Owner's Field Representative. No lift holes will be permitted in pipes twenty-four (24) inches in diameter or smaller.

Bell and spigot pipe shall be laid with the bell end upgrade; tongue and groove pipe shall be laid with the groove end upgrade. Trimming of the pipe will not be allowed.

Every length of pipe shall be inspected and cleaned of all dirt and debris before being laid. Prior to the placing of a length of pipe, the end of the previously laid length shall be carefully and thoroughly wiped smooth and cleaned to obtain an even and close-fitting joint.

No length of pipe shall be laid until the proceeding lengths of pipe have been thoroughly embedded in place, so as to prevent movement or disturbance of the pipe.

- B. Pipe Extensions - Where existing pipe is to be extended, the same type of pipe shall be used unless otherwise specified.

- C. Full Lengths of Pipe - Only full lengths of pipe are to be used in the installation except that partial lengths of pipe may be used at the entrance to structures where necessary to obtain a proper connection to the structure.
- D. Pipe Entrances to Structures - All pipe entering structures (e.g. manholes, drain inlets, catch basins, etc.) shall be cut flush with the inside face of the structure, and the cut ends of the pipe and surface of the structure shall be properly rounded and finished so that there will be no protrusion, ragged edges, or imperfections that will impede the flow of water or affect the hydraulic characteristics of the installation.

Only full sections of pipe shall be used where entering a structure which will be exposed to view, such as headwalls, end sections, etc.

- E. Bedding and Backfilling - The type of materials to be used as bedding and backfill and the method of placement shall conform to the requirements of the Article of these Specifications entitled "Trench Excavation and Backfill" and as shown on the details of the Drawings.
- F. Protection During Construction - The Contractor shall protect the installation at all times during construction. Movement of construction equipment, vehicles and loads over and adjacent to any pipe shall be done at the Contractor's risk.

At all times when pipe laying is not in progress, all open ends of all pipes shall be closed by approved temporary watertight plugs. If water is in the trench when work is resumed, the plugs shall not be removed until the trench has been pumped dry and all danger of water entering the pipe has been eliminated.

The Contractor shall furnish a sufficient pumping plan and shall provide and maintain at his own expense satisfactory drainage wherever needed in the trench and other excavations during the progress of the Work and at its completion for final inspection. No pipe or other structure shall be laid in water and water shall not be allowed to flow or rise under any concrete or other masonry. All water pumped or bailed from the trench or other excavation shall be conveyed in proper manner to a suitable point of discharge. The flow in all sewers, drains and watercourses encountered on the Work and in gutters along the sides of or across the Work shall be entirely provided for, both temporarily and permanently, as required, by the Contractor at his expense. All offensive water shall be removed from the Work at once.

- G. Tolerance - Pipe shall be laid accurately to the line and grade shown on the Drawings. Allowable tolerances shall be one-half (1/2) inch on grade and one (1) inch on line in any section of pipe between structures. No adverse grades shall be allowed. Deviations from these tolerances shall be a basis for rejection of the line of pipe. Any line which has been rejected shall be rebuilt to the correct line and grade by the Contractor at his own expense.
- H. Perforated Foundation Drain Piping - shall receive one blanket of Tyvar filter fabric, 30" wide coved over top of pipe and backfilled with 18" nominal #57 stone prior to general soil backfilling of trench.

2.06 PIPE JOINTS

A. Pipe shall be joined as specified herein:

1. Jointing Corrugated Polyethylene Drain Pipe - Corrugated external polyethylene couplers as provided by the pipe manufacturer shall be used. The joints shall be installed according to the manufacturer's specifications and as approved by the Civil Engineer.
2. Reinforced Concrete Pipe - ASTM C990-92.
3. PVCP Pipe – ASTM D 3034, SDR-35

2.07 STRUCTURES

A. General Requirements - All drainage structures shall be built in accordance with the details and at the locations shown on the Drawings and as specified herein. Where a specific material of construction is indicated, no substitution will be allowed unless authorized in writing by the Architect. Where more than one type of material of construction is indicated, the Contractor shall have the option of constructing the structure of any one of the materials specified. Precast concrete structures shall require shop drawing review by the Architect.

Cast-in-place concrete and/or masonry shall not be laid when the temperature is below 40 degrees F., or when indications are for lower temperatures within 24 hours, unless protection of concrete and masonry is established. In this event, the Contractor shall take measures to prevent concrete and masonry from being exposed to freezing temperatures for a period of not less than five (5) days after installation. Any damage to the structure because of freezing shall be corrected by the Contractor at his own expense.

All cast-in-place concrete and masonry shall be installed by personnel experienced and skilled in this work.

Manholes, drain inlets and catch basins are to be constructed as soon as the pipe laying reaches the location of the structures.

In constructing manholes, drain inlets and catch basins, the Contractor shall accurately locate each structure and set accurate templates to conform to the required line and grade. Any structure which is mislocated or oriented improperly shall be removed and rebuilt in its proper location, alignment and orientation at the Contractor's expense.

The Contractor shall use extreme care in the handling of precast concrete structures due to carelessness in handling or due to any of the Contractor's operations shall be repaired or replaced by the Contractor at his own expense.

Unless otherwise specified, all structures shall be constructed on concrete foundations. All foundations shall rest on firm soil of uniform bearing. If the soil beneath the foundation is unsuitable, the Contractor shall remove this unsuitable material as directed by the Soils Engineer and replace it with an approved properly compacted granular material conforming to the requirements of the Article of these Specifications entitled "Trench Excavation and Backfill" to the bottom elevation of the structure.

B. Masonry Structures (Where shown on civil plans and where permitted) - The first course of masonry shall be embedded in the concrete foundation immediately after the foundation has been poured. Brick masonry units shall be thoroughly wetted before laying.

All masonry shall be laid in a full bed of mortar, and all vertical and horizontal joints shall be filled solid with mortar. Vertical joints on each succeeding course shall be staggered. Joints shall be not less than three-eighths (3/8) inch or more than one-half (1/2) inch wide. Joints on the inside of the structure shall be neatly struck and pointed.

Where circular concrete block structures are specified or ordered to be constructed, they shall be designed and laid so that the interior surface of the structures are cylindrical for the straight sides and, except for shallow structures as specified below, the top sections shall be conical for the top courses, with no offsets, gradually diminishing in size to receive the castings of the types and sizes shown and/or specified. Concrete block units shall be designed so that only full length units are required to lay any one course. Cut block will not be allowed.

Corner units for rectangular concrete block structures must be "L" shaped with an inside return side equal to half the length of the normal unit. Units shall be designed so that only full length units are required to lay any one course.

Unless otherwise specified, the interior surface of the walls of masonry structures shall be painted upon completion with three (3) coats of neat cement grout without sand, applied with an interval of at least 24 hours between applications. The exterior surface of the walls of masonry structures shall be plastered with a one-half (1/2) inch coat of 1:2 cement mortar.

- C. Cast-in-Place Concrete Structures - Cast-in-place concrete structures shall be constructed of Class "A" concrete with reinforcing as shown in detail on the Drawings and as specified herein.

Material and construction requirements shall be as specified under the Article of these Specifications entitled "Site Concrete".

- D. Precast Concrete Structures - Precast concrete structures shall be installed only after shop drawings have been approved. All precast concrete structures shall be designed and fabricated for an H-20 design load.

The base of the precast concrete structures shall be set on a foundation pad of crushed stone eight (8) inches in compacted thickness. Foundations of all precast concrete structures shall rest on firm soil of uniform bearing. If soil beneath the foundation is unsuitable, the Contractor shall remove the unsuitable material as directed by the Soils Engineer and replace it with an approved properly compacted granular backfill material conforming to the requirements of the Article of these Specifications entitled "Trench Excavation and Backfill" to the bottom elevation of the crushed stone pad.

After pipes have been installed, all openings shall be properly sealed with non-shrinking cement mortar grout as directed. Grout around pipes which protrude through the walls of the structure and on all joints shall contain "Antihydro", or other approved additive, to insure watertightness. Cement grout shall contain one (1) part cement to two (2) parts sand by volume and additive in accordance with manufacturer's recommendations. Mortar shall be applied to the bottom one-third (1/3) of the opening before the pipe is inserted.

The precast concrete top section shall be set sufficiently below finished grade to permit a maximum of four (4) and a minimum of two (2) courses of eight (8) inch brick to be used as risers to adjust the grade of the casting. Manhole frames shall be set on a grout pad as specified herein above.

- E. Shallow Circular Structures - For shallow circular structures, the top conical section shall be replaced by a flat reinforced concrete slab with the proper size opening to accommodate the

specified casting. The minimum thickness of the reinforced concrete slab shall be six (6) inches and shall be designed for an H-20 design load. In general, and unless otherwise specified or directed by the Site Engineer, the flat slab top shall be used for circular structures whose depth from pipe invert to finished grade is five (5) feet or less.

- F. Inverts - Smooth invert channels shall be constructed in all manholes and in all drain inlets and catch basins which do not have sumps, to insure a smooth flow of water through the structure.

Invert channels for precast concrete structures shall be constructed of concrete; invert channels for masonry structures may be constructed of concrete or brick.

Extreme care shall be taken by the Contractor to construct invert channels to the shape, elevations and dimensions shown, specified or ordered by the Site Engineer.

When a curve in the invert channel or some other condition prevents the use of channels as shown on the Drawings, then such channels shall be constructed in accordance with the directions of the Civil Engineer/Architect.

When pipes entering and leaving a manhole are of different diameters, the invert channel shall be constructed so as to provide a smooth transition from the inflow pipe(s) to the outflow pipe.

The invert channel shall be carried up to the elevations shown on the Drawings. Channels shall slope smoothly and evenly from the inflow pipe(s) to the outflow pipe.

Split pipe for channels will be considered only in those instances where the drain line is of concrete pipe and the major inflow pipe and outflow pipe is of the same size and alignment.

Invert channels shall be built for future extensions where shown on the Drawings.

- G. Frames and Covers/Grates - Frames and covers/grates for drain structures shall be of the types and sizes indicated on the Drawings. Frames shall be well bedded in mortar and shall be set accurately to the correct alignment and grade. In areas to be paved, frames shall be set by using four (4) points of reference, set 90 degrees apart, to insure accurate setting to proposed pavement grade.

Where drain inlets and/or catch basins are to be placed on curb lines or at edge of pavements, sufficient length of proposed curb or edge of pavement adjacent to the structure shall be established prior to construction of the drain inlet and/or catch basin to insure that the structure is correctly located and oriented.

H.

- I. Steps - Steps shall be installed in all manholes. Steps shall also be installed in all drain inlets and catch basins greater than four (4) feet in depth unless otherwise specified.

Steps shall be set securely in place during the construction of the wall for masonry structures and during fabrication of the wall section for precast concrete structures.

## 2.08 CONNECTIONS TO EXISTING FACILITIES

- A. General Requirements - The Contractor shall make all required connections of the proposed drainage facilities into existing drainage facilities, where and as shown on the Drawings.
- B. Compliance with Requirements of Owner of Facility - Connections made into existing drainage facilities shall be done in accordance with the requirements of the owner of the facility and the jurisdiction. The Contractor shall be required to comply with all such requirements, including securing of all required permits and paying the costs thereof. The cost of making the connections in accordance with the requirements of the owner of the existing facility shall be included in the Contract Sum.

## 2.09 ALTERATION, RECONSTRUCTION AND/OR CONVERSION OF EXISTING STRUCTURES

- A. General Requirements - The Contractor shall alter, reconstruct and/or convert existing structures where as shown on the Drawings. In general, alterations shall be made with the same type of material used in the original construction unless otherwise indicated on the Drawings.
- B. Adjustment to New Grade and Alignment - All castings on existing drainage structures that are to remain shall be adjusted to new grade and alignment. When such adjustment is required the castings shall be carefully removed and the walls of the structures reconstructed as required. The castings shall be cleaned and reset in a firm mortar bed to the new grade and alignment. Existing castings which are broken, damaged or otherwise unfit for incorporation into the new work shall be replaced under the Contract Sum.
- C. Structures to be Converted - Structures which are to be converted (e.g. manholes to drain inlets or catch basins, drain inlets or catch basins to manholes) shall conform as closely as possible to the design of the proposed structure. Sufficient masonry shall be removed from the existing structure to insure that the walls can be rebuilt to conform to the proposed construction. Furnishing and installation of new castings for the converted structures shall be included in the Contract Sum.
- D. Removal of Portions of Wall of Existing Structures - In all cases of alteration, reconstruction and/or conversions of existing structures, existing walls shall be removed to a point where the existing walls will provide sound and adequate foundation for the construction of the new walls.
- E. Reconstruction and/or Rebuilding of Existing Invert - Where new pipes are to be installed into an existing structure, the existing invert shall be reconstructed and/or rebuilt as directed to accommodate installation of the new pipes and provide for proper transition of flows into and out of the structure.
- F. Damage to Existing Structure and/or Pipe - The Contractor shall exercise extreme care during such alteration, reconstruction and/or conversions so as not to damage any portions of the structure and/or pipe shown to remain. Any such damage shall be repaired by the Contractor at his own expense.

- G. Structures to be Cleaned - Upon completion of alteration, reconstruction and/or conversion of existing structures, all structures shall be cleaned of any accumulation of silt, debris or foreign matter of any kind and shall be kept clean of such accumulation until final acceptance of work.

2.10 RELOCATION AND/OR ABANDONMENT OF EXISTING FACILITIES

- A. The Contractor shall not abandon, disconnect, obstruct or in any other way interfere with the operation of an existing storm drain facility until such time as adequate permanent or temporary substitute facilities have been constructed and placed in operation.

2.11 LEADER DRAINS

- A. General Requirements - The Contractor shall make all required connection(s) of the building leader drain(s) into the on-site drainage system whether shown or not on the Drawings. Work shall include making the leader drain connection(s) into the on-site drainage system, furnishing and installing all leader drain pipe from the on-site drainage system to the building leader drains. The connection(s) shall be made with proper fittings and/or adapters compatible with the building leader drains providing watertight connection(s) and shall be done at no additional cost to the Owner. Connect all downspouts to subterranean storm water collection pipe system, whether shown specifically on drawings or not.
- B. Coordination with Building Plumbing Contractor - The Contractor will be required to coordinate his work with the work of the building plumbing contractor to determine the exact location(s) and elevation(s) of the point(s) of entry into the building(s) prior to construction.
- C. Connection into On-Site Drainage System - Leader drain connection(s) to the on-site drainage system shall be made at structure(s) or into the pipe where and as shown on the Drawings at every roof leader and downspout on exterior building walls. Pipe connections shall be made with proper size and type tee and/or wye fittings supplied by the pipe manufacturer.

2.12 UNDERDRAINS

- A. General Requirements - The Contractor shall install all underdrains where and as shown on the Drawings.
- B. Pipe Installation - A minimum of four (4) inch layer of approved underdrain filter material shall be placed and compacted in the bottom of the trench as a bedding for the pipe. Underdrain pipe of the type and size specified shall be embedded firmly in this bedding material to the line and grade shown on the Drawings.

Unless otherwise specified, perforated pipe shall be laid with the perforations down and the pipe sections shall be jointed securely with the appropriate fittings or bands. Upgrade ends of pipe underdrains shall be closed with suitable plugs.

- C. Backfilling - After the pipe installation has been inspected and approved, underdrain filter material shall be hand-shoveled around and over the pipe to such a depth that, after compaction, it extends a minimum of four (4) inches above the underdrain pipe. The surface of the underdrain filter material shall then be compacted with a vibrating pad compactor, and the remainder of the filter material shall be placed in lifts not more than six (6) inches in thickness with each lift thoroughly compacted with a mechanical vibrating pad compactor. The height of filter material over all pipe shall be as indicated on the Drawings.
- D. Geotextile Fabric - Geotextile fabric shall be placed where and as shown in detail on the Drawings. Ends and sides of fabric shall be lapped a minimum of twelve (12) inches.

- E. Pipe Connections and Changes in Alignment - Pipe to pipe connections and changes in pipe alignment shall be made only with prefabricated fittings to be supplied by the manufacturer of the pipe (e.g. tees, wye branches, etc.).

#### 2.13 CLEANING AND REPAIR

- A. The Contractor shall clean the entire drainage system of all debris and obstructions. This shall include, but not be limited to, removal of all formwork from structures, concrete and mortar droppings, construction debris and dirt. The system shall be thoroughly flushed clean and the Contractor shall furnish all necessary hose, pumps, pipe and other equipment that may be required for this purpose. No debris shall be flushed into existing storm drains or streams. All debris shall be removed from the system.

After the system has been cleaned, the Contractor shall thoroughly inspect the system and all repairs shown to be necessary shall be promptly made by the Contractor.

All work of cleaning and repair as specified herein and as required by jurisdiction inspectors shall be done at the Contractor's expense.

#### 2.14 FINAL TESTS AND INSPECTIONS

- A. Upon completion of the Work and before final acceptance by the Owner, the entire drainage system shall be subjected to an inspection in the presence of the Owner's Field Representative. The Work shall not be considered as complete until all design and jurisdiction requirements for line, grade cleanliness, and workmanship have been met.

### PART 3 - MATERIALS

The materials to be used in the construction shall be those indicated on the Drawings and specified herein. The Contractor shall supply to the Architect, prior to installation, certificates of compliance for the materials used. The Contractor shall also submit shop drawings and catalog cuts of all storm drain items and appurtenances (pipe, fittings, joints, castings, steps, precast concrete structures, etc.) to the Architect for approval prior to ordering.

#### 3.01 STORM DRAIN PIPE, FITTINGS AND JOINTS

- A. Corrugated Polyethylene Drain Pipe and Fittings (CPDP) - shall have a smooth interior and conform to the requirements of AASHTO Designation M-294. Pipe shall be Hi-Q Pipe as manufactured by Hancor or approved equal or as indicated on drawings with same requirements.
- B. Underdrains - Pipe, Fittings and Filter Materials
  - 1. Perforated Polyvinyl Chloride Pipe (PPVCP) - shall conform to the requirements of AASHTO Designation M-278, and shall be Perforated Highway Underdrains and Fittings as manufactured by Carlon or approved equal.
  - 2. Filter Material - shall be approved crushed aggregate meeting the requirements of ASTM Designation C-33, size No. 57.
  - 3. Filter Fabric - shall be Mirafi 140N or approved equal.
- C. Polyvinyl Chloride Pipe and Fittings For Gravity Lines (PVCP)

1. Shall conform to the requirements of ASTM Designation D-3034 for SDR-35 extra strength pipe and fittings. Pipe shall have integral wall bell and spigot joints. Assembly shall be by means of push-on joints using flexible elastomeric seals conforming to ASTM Designation D-3212.  
  
All fittings and accessories shall be furnished by the pipe manufacturer. Joint lubricant shall be as recommended by the pipe manufacturer.
2. PVC pipe shall have common profiles for inter-changeability between rough-barrel dimensions, couplings, ends, and elastomeric gaskets to facilitate future repairs. When assembled, the pipe shall have only one gasket per bell and spigot end, and/or two gaskets per coupling.
3. Sewer pipe shall be furnished in standard 3.96m or 6.10m (13' or 20") lengths, unless otherwise detailed or required on the Approved Plans.
5. Follow the Manufacturer's recommendations for the minimum allowable radius for the size of pipe used.
6. All pipe, fittings, and couplings shall be clearly marked in accordance with ASTM D3034, F679, and F794, respectively.
6. All pipe shall have a home mark on the spigot end to indicate proper penetration when the joint is made.

### 3.02 STRUCTURES

- A. General - Where material requirements specified hereinafter conflicts with the requirements of Authorities having jurisdiction, the requirements of the Authority having jurisdiction shall govern.
- B. Brick - shall conform to the "Specifications for Sewer and Manhole Brick (made from Clay or Shale)", AASHTO Designation M-91, Grade MS.
- C. Concrete Block - shall be solid block and shall conform to the "Specifications for Concrete Masonry Units for Construction of Catch Basins and Manholes", ASTM Designation C-139.
- D. Precast Concrete Structures - Prior to fabrication, the Contractor shall submit four (4) sets of plans of the proposed precast concrete structures to the Site Engineer for approval along with design criteria and certification by the manufacturer that the structure will support the design load. Unless specified otherwise, precast concrete structures shall be designed for an H-20 design load.

Precast concrete manhole sections shall conform to ASTM Designation C-478. Joints for manhole sections shall conform to ASTM Designation C-443.

The minimum compressive strength of the concrete used for all precast structures shall be 4,000 psi. Where steps are required in structures, steps shall be installed during the casting of the structures, aligned as specified herein. Joints in the structures shall be tongue and groove joints, formed in such a manner so that a watertight rubber seal can be applied.

No precast concrete structure shall be fabricated or delivered to the job site until it has been reviewed by the Architect. All structures shall have an identifying number and manufacturer's name on each section.

When precast concrete structures are to be used, the Contractor shall bear all responsibility for the proper locations and sizes of all openings to receive the pipe. The review of shop drawings by the Architect shall not relieve the Contractor of his responsibility in this matter. Should field revisions to the structure be necessary due to improper location of openings or unforeseen field conditions such as line and/or grade changes, deletion of structures, relocation of structures, or addition or deletion of lines to be connected into the structures, then the Contractor will be required to make all necessary and required revisions to the satisfaction of the Architect and at no additional cost to the Owner.

- E. Manhole Frames and Covers - shall be as specified on the Drawings. Castings shall be gray cast iron, American made by a nationally recognized casting manufacturer conforming to the requirements of AASHTO Designation M-105, Class 30 and shall be true to pattern in form and dimensions as specified, free from pouring faults, sponginess, cracks, blowholes and other defects that affect their strength and other characteristics for the intended use. All surfaces have a workmanlike finish.

All component parts shall fit together in a satisfactory manner and frames and covers shall be of a design that will prevent rocking or rattling under traffic. Frames and covers that are warped or rocking shall be rejected and shall be removed and replaced.

Unless otherwise specified, the word "STORM" shall be integrally cast on the cover in raised letters and centered. Letter size shall be two (2) inches.

If directed, and at no additional cost to the Owner, castings shall be coated with an asphalt paint which shall result in a smooth coating and not be tacky or brittle.

- F. Drain Inlet and Catch Basin Frames and Grates - shall be as specified on the Drawings and in accordance with the following requirements and shall be American made by a nationally recognized casting manufacturer:

1. Cast Iron - shall be gray cast iron castings conforming to the requirements of AASHTO Designation M105, Class 30. All requirements of workmanship and material as specified for manhole castings shall apply herein. If directed, and at no additional cost to the Owner, castings shall be coated with an asphalt paint which shall result in a smooth coating and not be tacky or brittle.

All component parts of the frames and grates shall fit together in a satisfactory manner and frames and covers shall be of a non-rocking design so as to prevent rocking or rattling under traffic. Frames and grates that are warped or rocking shall be rejected and shall be removed and replaced by the Contractor.

- G. Concrete and Reinforcing - shall conform to the requirements as specified under the Section of these Specifications entitled "Site Concrete".

- H. Mortar - shall be composed of one (1) part Portland cement and two (2) parts sand by volume. Material requirements shall be as follows:

1. Portland Cement - shall conform to the requirements of AASHTO Designation M-85.
2. Mortar Sand - shall conform to the requirements of AASHTO Designation M-45, except that aggregate shall be no coarser than #8 sieve size.

3. Water - shall be clean and shall not contain any oil, acid, alkali, salts, vegetable matter, organic matter or other deleterious substances. When possible, water shall be from a municipal system.

Hand mixing of mortar will be permitted only when the amount of mortar to be used makes machine mixing undesirable. When hand mixing is used, the ingredients must first be thoroughly mixed dry in a tight box. The proper quantity of clean water shall then be gradually added, and the materials shall be hoed or worked until a uniform mixture is secured. Admixtures may not contain calcium chloride.

No greater quantity of mortar is to be prepared than is required for immediate use, and it shall be worked over constantly with hoe or shovel until used. No mortar shall be retempered, and none shall be used more than one and one-half (1-1/2) hours after mixing. All mortar which remains upon stopping work shall be discarded.

- I. Steps - Steps in drainage structures shall be as specified herein and on the details of the Drawings and shall meet the requirements for steps and ladders as specified under ASTM Designation C-478.
  1. Malleable or Ductile Cast Iron - shall be designed for a minimum design live load of a single concentration of 300 pounds. Material shall be of Iron, Class 25A, in accordance with ASTM Designation A-48 or Malleable Iron, Grade 35018 in accordance with ASTM Designation A-47.
  2. Plastic Coated Steel - shall be No. 4 deformed reinforcement bar meeting the requirements of ASTM Designation A-615, Grade 60 which shall be coated with polypropylene plastic meeting the requirements of ASTM Designation D-2146 for Type II, Grade 49108.

All steps shall be true to pattern, form dimensions, and free from defects which would affect their strength. Steps having defects filled with putty or cement of any kind shall be rejected.

END OF SECTION

SECTION 02751 - CEMENT CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Driveways
- 2. Roadways.
- 3. Parking lots.
- 4. Curbs and gutters.
- 5. Walks.

- B. Related Sections:

- 1. Division 2 Section "Earthwork".
- 2. Division 2 Section "Pavement Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and asphalt paving or adjacent construction.
- 3. Division 3 Section "Cast-in-Place Concrete" for general building applications, site walls and other structural elements of concrete.

1.3 REFERENCES

- A. Organization and Trade Standards
  - 1. Standard Specifications for Public Works Construction, latest edition, as adopted by local jurisdictional authority, including amendments.
  - 2. Regional Standard Drawings, current edition, with all local agency amendments.

1.4 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.5 SUBMITTALS

- A. Mix Design/Materials List:

1. Submit concrete mix design prepared by a certified batch plant or laboratory, selected by Contractor and acceptable to Owner, for review and approval.
  2. Accompanying mix design, submit materials certificates signed by material producer and Contractor, certifying that each material item complies with, or exceeds, specified requirements. For the following, from manufacturer:
    - a. Cementitious materials.
    - b. Steel reinforcement and reinforcement accessories.
    - c. Admixtures.
    - d. Curing compounds.
    - e. Joint fillers.
- B. Other Action Submittals:
1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Samples for Verification: For each type of product or exposed finish, prepared as Samples of size indicated below:
1. Exposed Aggregate: 10-lb (4.5-kg) Sample of each mix.
  2. Wheel Stops: 6 inches (150 mm) long showing cross section; with fasteners.
- D. Material Test Reports: For each of the following:
1. Aggregates. Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.
- E. Shop Drawings: Show locations and layout of isolation (expansion) joints and contraction (control) joints.
- F. Mock-up
1. Prior to installing any concrete paving, construct, at an approved location on-site, an individual mock-up showing each concrete paving finish specified and shown on drawings. Mock-up shall include sealant joint preparation. Each finish shall be 4' x 4' minimum. Obtain Architect's approval of mock-up.
  2. All concrete paving shall match approved mock-up.
  3. Remove mock-up after completion of work and dispose off-site.

#### 1.6 QUALITY ASSURANCE

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").
- B. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
- C. Concrete Testing Service: Engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.
- D. ACI Publications: Comply with ACI 301 (ACI 301M) unless otherwise indicated.

#### 1.7 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F (4.4 deg C) for oil-based materials or 55 deg F (12.8 deg C) for water-based materials, and not exceeding 95 deg F (35 deg C).

### PART 2 - PRODUCTS

#### 2.1 DESIGN CRITERIA

- A. General
  1. All improvements shall be constructed per the referenced standards, the contract documents, and as specified in this section.
  2. Where criteria shown on drawings or specified in this specification exceed that of the referenced standards, the more stringent criteria shall apply.

#### 2.2 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
  1. Use flexible or uniformly curved forms for curves with a radius of 100 feet (30.5 m) or less. Do not use notched and bent forms.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

#### 2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420); deformed.
- B. Plain-Steel Wire: ASTM A 82/A 82M.
- C. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420) plain-steel bars; zinc coated (galvanized) after fabrication according to ASTM A 767/A 767M, Class I coating. Cut bars true to length with ends square and free of burrs. Provide polyethylene closed-end sleeve or approved alternate at expansion joint dowels

- D. Where deformed bar reinforcing not shown, provide welded wire fabric, flat sheet stock, 12x12-W2.8x2.8 or approved equivalent, per ASTM A-185, at all concrete paving conditions.
- E. Tie Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- F. Hook Bolts: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), internally and externally threaded. Design hook-bolt joint assembly to hold coupling against paving form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.
- G. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:
  - 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
- H. Zinc Repair Material: ASTM A 780.

## 2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
  - 1. Portland Cement: ASTM C 150, gray portland cement Type II, low alkali, produced in the United States. Supplement with the following:
    - a. Fly Ash: ASTM C 618, Class C.
    - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C 33, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.
  - 1. Maximum Coarse-Aggregate Size: 1 inch (25 mm) nominal.
  - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Exposed Aggregate: Selected, hard, and durable; washed; free of materials with deleterious reactivity to cement or that cause staining; from a single source, with gap-graded coarse aggregate as follows:
  - 1. Aggregate Sizes: [3/4 to 1 inch (19 to 25 mm)] [1/2 to 3/4 inch (13 to 19 mm)] [3/8 to 5/8 inch (10 to 16 mm)] <Insert dimensions> nominal.
  - 2. Aggregate Source, Shape, and Color: <Insert requirements>.
- D. Water: Potable and complying with ASTM C 94/C 94M.
- E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
  - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
  - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

## 2.5 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Axim Italcementi Group, Inc.; Caltexol CIMFILM.
    - b. BASF Construction Chemicals, LLC; Confilm.
    - c. ChemMasters; Spray-Film.
    - d. Conspec by Dayton Superior; Aquafilm.
    - e. Dayton Superior Corporation; Sure Film (J-74).
    - f. Edoco by Dayton Superior; BurkeFilm.
    - g. Euclid Chemical Company (The), an RPM company; Eucobar.
    - h. Kaufman Products, Inc.; VaporAid.
    - i. Lambert Corporation; LAMBCO Skin.
    - j. L&M Construction Chemicals, Inc.; E-CON.
    - k. Meadows, W. R., Inc.; EVAPRE.
    - l. Metalcrete Industries; Waterhold.
    - m. Nox-Crete Products Group; MONOFILM.
    - n. Sika Corporation, Inc.; SikaFilm.
    - o. SpecChem, LLC; Spec Film.
    - p. Symons by Dayton Superior; Finishing Aid.
    - q. TK Products, Division of Sierra Corporation; TK-2120 TRI-FILM.
    - r. Unitex; PRO-FILM.
    - s. Vexcon Chemicals Inc.; Certi-Vex EnvioAssist.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
  - 1. Products: Basis of Design - Provide Burke Aqua Resin, with fugitive dye, and complying with ASTM C309, Type 1-D at all natural color concrete curbing and non-paving applications.
  - 2. Products: Basis of Design - Provide Scofield Lithochrome Colorwax curing compound, VOC compliant formulation, at all integral colored concrete paving.
  - 3. Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Anti-Hydro International, Inc.; A-H Curing Compound #2 DR WB.
    - b. ChemMasters; Safe-Cure Clear.
    - c. Conspec by Dayton Superior; D.O.T. Resin Cure.
    - d. Dayton Superior Corporation; Day-Chem Rez Cure (J-11-W).
    - e. Edoco by Dayton Superior; DSSCC Clear Resin Cure.
    - f. Euclid Chemical Company (The), an RPM company; Kurez W VOX.
    - g. Kaufman Products, Inc.; Thinfilm 420.
    - h. Lambert Corporation; AQUA KURE - CLEAR.

- i. L&M Construction Chemicals, Inc.; L&M CURE R.
- j. Meadows, W. R., Inc.; 1100-CLEAR SERIES.
- k. Nox-Crete Products Group; Resin Cure E.
- l. SpecChem, LLC; PaveCure Rez.
- m. Symons by Dayton Superior; Resi-Chem Clear.
- n. Tamms Industries, Inc., Euclid Chemical Company (The); TAMMSCURE WB 30C.
- o. TK Products, Division of Sierra Corporation; TK-2519 WB.
- p. Vexcon Chemicals Inc.; Certi-Vex Enviocure 100.

4. Cure and Sealing Compound

- a. Products: Basis of Design - Provide Burke Spartan-Cote WB, complying with ASTM C309, Type 1-A and B, at natural color exterior concrete paving.

2.6 PAVING BASE

- A. Where shown on drawings, provide crushed aggregate base per Section 200-2.2.1 of the Standard Specification for Public Works Construction "Greenbook".

2.7 RELATED MATERIALS

- A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.
- B. Expansion Joint Material: W. R. Meadows or equal, Sealtight Fiber filler, full depth of slab, matching profile, 1/2 inch thickness or as shown on drawings.
- C. Expansion Joint Material - Radius Conditions: W. R. Meadows or equal, Sealtight Ceramar flexible foam resilient filler, full depth of slab, 3/8 inch thickness or as shown on drawings.
- D. Joint Cap: W. R. Meadows or equal, SealTight Snap Cap, size required for expansion material.
- E. See Division 2, "Pavement Joint Sealant" for sealant use after removal of Snap Cap.

2.8 PAVEMENT MARKINGS

- A. Pavement-Marking Paint: MPI #97 Latex Traffic Marking Paint.
  - 1. Color: White, Yellow, Blue or as indicated.
- B. Pavement-Marking Paint for painted lines and markings for accessible and disabled parking and site access:
  - 1. Color: Blue in color equal to Color No. 15090 per Federal Standard 595B.
  - 2. Width: Painted lines and markings on pavement shall be 3" minimum wide.
  - 3. Parking spaces for disabled shall be marked according to CBC Section 1129B.3.
  - 4. Tactile warning lines shall be in conformance to CBC Section 1133B.8.3, 1133B.8.4 and 1133B.8.5.

- C. Glass Beads: AASHTO M 247, Type 1.

2.9 WHEEL STOPS

- A. Wheel Stops: Precast, air-entrained concrete, 2500-psi (17.2-MPa) minimum compressive strength, 4-1/2 inches (115 mm) high by 9 inches (225 mm) wide by 72 inches (1820 mm) long. Provide chamfered corners and drainage slots on underside and holes for anchoring to substrate.
1. Dowels: Galvanized steel, 3/4 inch (19 mm) in diameter, 10-inch (254-mm) minimum length.

2.10 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301 (ACI 301M) and Public Works Construction Standard Specifications (Green Book), for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that meet or exceed requirements.
- B. Product Characteristics: Paving/flatwork/ramps/stairs:
1. Compressive Strength: 3250 psi. Strength selected for durability. Concrete is non-structural, and does not require special inspection.
2. Combined Aggregate Grading:
- a. Class C per Standard Specification for Public Works Construction "Greenbook" Section 201-1.3.2
- b. Aggregate shall be non-reactive per ASTM C 289, and shall comply with ASTM C33, Table 3, Class 4M.
3. Cement Content: 560 pounds per cubic yard concrete
4. Slump: 4 inch maximum
5. Finish:
- a. Broom finish natural concrete paving.
- b. Broom finish integral color concrete paving.
6. Water-Cement Ratio: 0.55 maximum.
7. Integral Color Admixture: Scofield Chromix or equal.
8. Surface Retarder: Scofield Lithotex Top Surface Retarder or equal.
- C. Product Characteristics: Curbing, gutters, related drainage components.
1. Compressive Strength: 3250 psi
2. Combined Aggregate Grading:
- a. Class C per Standard Specification for Public Works Construction "Greenbook" Section 201-1.3.2
3. Cement Content: 520 pounds per cubic yard concrete
4. Slump: 4 inch maximum
5. Finish: Per Section 303-5.5.2 of Standard Specifications for Public Woks Construction, "Greenbook," and with flatwork finishes as defined in this Section and per Drawings.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture in concrete as required for placement and workability.
  2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
- F. Cementitious Materials: Limit percentage by weight of cementitious materials other than portland cement according to ACI 301 (ACI 301M) requirements for concrete exposed to deicing chemicals. As follows:
1. Fly Ash or Pozzolan: 25 percent.
  2. Ground Granulated Blast-Furnace Slag: 50 percent.
  3. Combined Fly Ash or Pozzolan, and Ground Granulated Blast-Furnace Slag: 50 percent, with fly ash or pozzolan not exceeding 25 percent.

## 2.11 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M. Furnish batch certificates for each batch discharged and used in the Work.
1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.
1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph (5 km/h).
  2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons (13.6 tonnes).
  3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch (13 mm) according to requirements in Division 2 Section "Earthwork."
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Verify sub-grade, base material, conduit, and all other embedded items are properly located in relation to concrete paving. Secure all embedded items against displacement during pour.
- B. Verify all grades for pitch and fall prior to pouring pavements.

- C. Verify that all cross-fall and ramp criteria comply with all accessibility regulations, including Title 24 requirements.
- D. Verify compaction of existing subgrade complies with criteria specified in Division 2, "Earthwork."
- E. Notify inspector 48 hours prior to placing concrete. Obtain inspectors approval of subgrade, forming and embedded items prior to placing.
- F. Remove loose material from compacted subbase surface immediately before placing concrete.

### 3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage. Coat forms with approved bond breaker, suitable for use on integral colored concrete without staining or discoloration. Place sand bed over existing paving receiving new concrete paving.

### 3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Zinc-Coated Reinforcement: Use galvanized-steel wire ties to fasten zinc-coated reinforcement. Repair cut and damaged zinc coatings with zinc repair material.

### 3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
  - 1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
  - 1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
  - 2. Provide tie bars at sides of paving strips where indicated.
  - 3. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.

4. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation (Expansion) Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
1. Provide expansion joints at intervals of 50 feet (15.25 m) unless otherwise indicated.
  2. Provide where paving is adjacent to walls, bollard or column penetrations, light pole, utility box or footings.
  3. Provide at pavement plazas and fields, approximately 20 feet on center each way, and as necessary to limit area to a maximum of 400 square feet.
  4. Extend joint fillers full width and depth of joint and terminate not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
  5. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
  6. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together
  7. Tool all edges adjacent to expansion material with maximum 1/8 inch radius tool.
  8. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint and provide bondbreaker tape at surface of joint material cover cap.
  9. Provide sealant and backer rod assembly per Division 2, "Pavement Joint Sealants" when provided, if not see Division 7, "Joint Sealants" and as shown on drawings
- D. Contraction (Control) Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows, to match jointing of existing adjacent concrete paving:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch (6-mm) radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.
    - a. Tolerance: Ensure that grooved joints are within 3 inches (75 mm) either way from centers of dowels.
  2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch (3-mm) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
    - a. Tolerance: Ensure that sawed joints are within 3 inches (75 mm) either way from centers of dowels.
  3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
  4. Provide at curbs, curb and gutter assemblies, and cross gutters at 20 feet on center maximum. Where concrete pavement occurs adjacent to curb, align curb and pavement joints.
  5. Provide at pavement plazas and fields, approximately 10 feet on center each way, and as necessary to limit area to a maximum of 100 square feet.
  6. Provide at pavement areas at all re-entrant corners and at changes in direction.
  7. Provide control (weakened plane) joints by saw cutting method, hand held jointing tools, or by use of SOF-CUT equipment. Use of zip-strip not acceptable.

- E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch (6-mm) radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

### 3.6 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.
- B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 (ACI 301M) requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete according to ACI 301 (ACI 301M) by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
  - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels and joint devices.
- H. Screed paving surface with a straightedge and strike off.
- I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- J. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.
- K. Slip-Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.
  - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.
- L. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
  - 1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.

2. Do not use frozen materials or materials containing ice or snow.
  3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
- M. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and as follows when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
  3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

### 3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
  2. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch (1.6 to 3 mm) deep with a stiff-bristled broom, perpendicular to line of traffic.

### 3.8 SPECIAL FINISHES

- A. Monolithic Exposed-Aggregate Finish: Expose coarse aggregate in paving surface as follows:
1. Immediately after float finishing, spray-apply chemical surface retarder to paving according to manufacturer's written instructions.
  2. Cover paving surface with plastic sheeting, sealing laps with tape, and remove when ready to continue finishing operations.
  3. Without dislodging aggregate, remove mortar concealing the aggregate by lightly brushing surface with a stiff, nylon-bristle broom. Do not expose more than one-third of the average diameter of the aggregate and not more than one-half of the diameter of the smallest aggregate.
  4. Fine-spray surface with water and brush. Repeat cycle of water flushing and brushing until cement film is removed from aggregate surfaces to depth required.
- B. Seeded Exposed-Aggregate Finish: Immediately after initial floating, spread a single layer of aggregate uniformly on paving surface. Tamp aggregate into plastic concrete and float finish to entirely embed aggregate with mortar cover of 1/16 inch (1.6 mm).
1. Spray-apply chemical surface retarder to paving according to manufacturer's written instructions.

2. Cover paving surface with plastic sheeting, sealing laps with tape, and remove sheeting when ready to continue finishing operations.
  3. Without dislodging aggregate, remove mortar concealing the aggregate by lightly brushing surface with a stiff, nylon-bristle broom. Do not expose more than one-third of the average diameter of the aggregate and not more than one-half of the diameter of the smallest aggregate.
  4. Fine-spray surface with water and brush. Repeat cycle of water flushing and brushing until cement film is removed from aggregate surfaces to depth required.
- C. Slip-Resistive Aggregate Finish: Before final floating, spread slip-resistive aggregate finish on paving surface according to manufacturer's written instructions and as follows:
1. Uniformly spread [25 lb/100 sq. ft. (12 kg/10 sq. m)] [40 lb/100 sq. ft. (19.5 kg/10 sq. m)] [60 lb/100 sq. ft. (29 kg/10 sq. m)] <Insert rate of application> of dampened, slip-resistive aggregate over paving surface in two applications. Tamp aggregate flush with surface using a steel trowel, but do not force below surface.
  2. Uniformly distribute approximately two-thirds of slip-resistive aggregate over paving surface with mechanical spreader, allow to absorb moisture, and embed by power floating. Follow power floating with a second slip-resistive aggregate application, uniformly distributing remainder of material at right angles to first application to ensure uniform coverage, and embed by power floating.
  3. Cure concrete with curing compound recommended by slip-resistive aggregate manufacturer. Apply curing compound immediately after final finishing.
  4. After curing, lightly work surface with a steel wire brush or abrasive stone and water to expose nonslip aggregate. Retain first paragraph below for rock-salt finish. Avoid this finish if water may be trapped and frozen in pitted surface. Revise weight of salt and procedure according to texture desired. Verify weight of salt on Project mockup if necessary.

### 3.9 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing moisture-retaining-cover curing, curing compound, or a combination of these as follows:
  1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm) and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.
4. Cure all integral color concrete with Lithochrome curing wax, applied as directed by Scofield. Do not permit overspray onto natural colored concrete.

### 3.10 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Level: 3/16 inch plus or minus, at any point, measured along a 10 foot straight edge.
2. Adjacent surfaces: 1/8 inch maximum difference at any point between adjacent concrete pours or between paving and adjacent paving materials.
3. Joint Alignment: 1/16 inch deviation from adjacent joint.
4. Line: 1/4 inch, plus or minus, deviation from a straight line in any 10 foot length, non-cumulative.
5. Final elevations shall comply with grades as shown on drawings, to a tolerance of plus or minus 0.25 inch.
6. Tolerances do not permit violation of dimensions or grade and slopes relationships required by code or jurisdictional authority. Adjust work as required to comply with such requirements.

### 3.11 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Allow concrete paving to cure for a minimum of 28 days and be dry before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils (0.4 mm).
1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to concrete surface. Mask an extended area beyond edges of each stencil to prevent paint application beyond stencil. Apply paint so that it cannot run beneath stencil.
  2. Broadcast glass beads uniformly into wet markings at a rate of 6 lb/gal. (0.72 kg/L).

### 3.12 WHEEL STOPS

- A. Install wheel stops in bed of adhesive applied as recommended by manufacturer.

- B. Securely attach wheel stops to paving with not less than two galvanized-steel dowels located at one-quarter to one-third points. Install dowels in drilled holes in the paving and bond dowels to wheel stop. Recess head of dowel beneath top of wheel stop.

### 3.13 FIELD QUALITY CONTROL

- A. Flood Test
  - 1. Provide flood test of all gutters and paving as directed by Architect.
  - 2. Where ponding occurs, or where drainage rate is less than that established by original design, replace all defective concrete. Remove concrete to the nearest joint line.
- B. Appearance
  - 1. Remove and replace concrete not matching approved mock-up, concrete not complying with specified tolerances, and concrete with the following defects.
    - a. Inconsistent texture.
    - b. Irregular or misaligned direction of texture.
    - c. Concrete with spalled or raveled control or expansion joints.
    - d. Concrete exhibiting splotching or discoloration in surface including discoloration due to "carbonation".
    - e. Concrete exhibiting cracking, including shrinkage cracking, where cracks are located between joint pattern.
  - 2. Use of patching mortar for repair of edge defects is subject to acceptance of final color and texture by Architect. Use of patching mortar not acceptable for repair of defective exposed aggregate finished concrete.
- C. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  - 1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  - 3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  - 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when it is 80 deg F (27 deg C) and above, and one test for each composite sample.
  - 5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
  - 6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
    - a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

- D. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
- E. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- G. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
- H. Concrete paving will be considered defective if it does not pass tests and inspections.
- I. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- J. Prepare test and inspection reports.

#### 3.14 REPAIRS AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Use of patching mortar for repair of edge defects is subject to acceptance of final color and texture by Architect. Use of patching mortar not acceptable for repair of defective exposed aggregate finished concrete.
- C. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.
- D. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- E. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 02751



## SECTION 02810 - IRRIGATION SYSTEM

### GENERAL

1. Permits
  - a. Contractor shall obtain and pay for all permits required for irrigation installation.
2. Manufacturer's Directions
  - a. Manufacturer's directions and detailed drawings shall be followed in all cases where the manufacturers of articles used in this Contract furnish directions covering points not shown in the Drawings and Specifications.
3. Ordinances and Regulations:
  - a. Comply with all local, municipal and state laws, rules and regulations.
  - b. Conform to applicable provisions of the latest editions of the Uniform Plumbing Code, the National Electric Code and all codes properly governing the materials and work at the project site.
4. Explanation of Drawings
  - a. Due to the scale of the Drawings, it is not possible to indicate all offsets, fittings, sleeves, etc., which may be required. The Contractor shall carefully investigate the structural and finished conditions affecting all of his work and plan his work accordingly, furnishing such fittings, etc., as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed. The work shall be installed in such a manner as to avoid conflicts between the irrigation system, planting, underground utilities, above ground utilities and architectural features.
  - b. All work called for on the Drawings by notes or details shall be furnished and installed whether or not specifically mentioned in the Specifications.
  - c. The Contractor shall not willfully install the irrigation system as shown on the Drawings when it is obvious in the field that obstructions, grade differences, or discrepancies in area dimensions exist that might not have been considered in engineering. Such obstructions or differences should be brought to the attention of the City's Authorized Representative. In the event this notification is not performed, the Contractor shall assume full responsibility for any revision necessary.
5. AS BUILT DRAWINGS
  - a. Record accurately on one set of black and white prints (irrigation drawings), all changes in work constituting departures from the original contract drawings. Include changes in both pressure and non-pressure lines.
  - b. Upon completion of each increment of work, transfer all such information and dimensions to the prints. Record changes and dimensions in a legible and professional manner. When the drawings are approved, the Contractor shall perform all final as-built drawings.
  - c. Dimension from two permanent points of reference (monuments, sidewalks, curbs, pavement). Record information on as-built drawings day-to-day as the work is installed. All dimensions noted on the drawings shall be 1/4 inch in size.
  - d. Show dimensional locations and depths of the following:
    1. Connection to existing water lines.
    2. Connection to existing electrical power.
    3. Point of connection – including backflow assembly, basket strainer, master valve, flow sensor
    4. Gate valves
    5. Routing of sprinkler pressure lines (dimension max. 100' along routing and at each change of direction).
    6. Electric control valves.
    7. Routing of control wiring and flow sensor cable.
    8. Quick coupling valves
    9. Sleeves and wire splice boxes

10. Other related equipment as directed by the City's Authorized Representative.
- e. Maintain as-built drawings on site at all times

#### 6. CONTROLLER CHARTS

- a. As-built drawings shall be provided by the Contractor prior to the preparation of the Controller Charts. As-builts shall be drawn on 3 mil sepia mylar of same size as construction documents.
- b. The Contractor shall provide two 11 x 17 color controller charts for each controller supplied, showing the area covered by the automatic controller.
- c. The chart shall be a reproduction of the as-built system drawing. If the controller sequence is not legible when the drawing is reduced, enlarge it to a size that will be readable when reduced.
- d. Charts shall be a photocopy print or computer plot with a different transparent color used to show area of coverage for each station.
- e. When completed and approved, hermetically seal the chart between two pieces of plastic, each piece being a minimum of 10 mils thick.

#### 7. OPERATION AND MANUALS

- a. Prepare all required and necessary descriptive material in complete detail and sufficient quantity, properly prepared in two individually bound copies. Describe the material installed in sufficient detail to permit qualified maintenance personnel to understand, operate and maintain the equipment. Each manual shall include the following:
  1. Index sheet stating contractor's address and telephone number.
  2. Duration of guarantee period with guarantee forms.

#### 8. SPARE PARTS AND EQUIPMENT

- a. Prepare and deliver to the City's Authorized representative, prior to the start of maintenance, all required spare parts, tools and equipment. Spare parts, tools, and equipment shall include the following per water meter:
  1. Operation and maintenance manuals.
  2. Automatic controller certification letter from Authorized Rainmaster Distributor for each controller installed under this contract.
  3. Two (2) keys for each automatic controller.
  4. One (1) set of special tools required for removing, disassembling and adjusting each type of sprinkler and valve supplied on this project.
  5. A minimum of one (1) five-foot key for operation of gate valves. Provide one (1) key for each type of operating device (2" operating nut, cross handle, etc.).
  6. Two (2) quick coupler keys and matching hose swivel for each type of quick coupling valve installed.
  7. Irrigation controller manuals.
  8. Color-coded controller charts laminated between 2 pieces of 10 mil plastic – Provide two charts for each controller.
  9. "As-built" record drawing mylars of irrigation plans.
  10. Completed Irrigation Guarantee Statement.
  11. Southern California Edison billing information.
  12. Water billing and meter information.

#### 9. QUALIFICATION OF IRRIGATION PERSONNEL

- a. Contractor and on site field superintendent shall have the following minimum qualifications:
  1. Not less than five years continuous experience in installation of commercial irrigation systems.
  2. Demonstrate completion of the manufacturer's installation certification program for the Eagle Plus Rainmaster controller.
  3. Upon City's authorized representative's request, supply a list of references listing successfully completed commercial irrigation systems.

10. GUARANTEE

- a. Submit written guarantee, in approved form, that all work showing defects in materials or workmanship will be repaired or replaced at no cost to the Builder or Developer contracted with the Landscape Contractor for a period of one (1) year from date of acceptance by the Irrigation Consultant.
- b. The guarantee form shall be written onto the Contractor's letterhead and contain the following information. (Shown as an example only)

***Guarantee for Irrigation System***

**555 Maple Sports Field**

*We hereby guarantee that the irrigation system we have furnished and installed for Tonner Hills, is free from defects in materials and workmanship, and the work has been completed in accordance with the drawings and specifications, ordinary wear and tear and unusual abuse, or neglect expected. We agree to repair or replace any defects in material or workmanship which may develop during the period of one (1) year from date of acceptance and also to repair or replace any damage resulting from the repairing or replacing of such defects at no additional cost to the City. We shall make such repairs or replacements within a reasonable time, as determined by the City, after receipt of written notice. In the event of our failure to make such repairs or replacements within a reasonable time after receipt of such written notice from the City, we authorize them to proceed to have said repairs or replacements made at our expense and we will pay for the costs and charges therefore upon demand.*

Project Name: 555 Maple Sports Field Project

Owner: City of Torrance

Landscape Architect: Land Concern

Tract Number(s) \_\_\_\_\_

Lot Number(s) \_\_\_\_\_

Signed: \_\_\_\_\_ Title: \_\_\_\_\_

Date of Signature: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

**PRODUCTS**

1. GENERAL PIPING

- a. Contractor shall be aware of sources of water for each water meter as they may vary within the same project. Differing sources of water may be treated with colored piping system.
- b. Domestic water pipe (Pressurized mainline and laterals) shall be extruded of an improved P. V. C. virgin pipe compound featuring high impact strength. Confirm to ASTM D-1784 or D-2241 to meet the requirements of cell classification 12454B for pipe. Compound shall have a 2,000 P. S. I. hydrostatic design stress rating. Pipe shall be white in color.

- c. Ultra-Violet Resistant (UVR) pipe shall be extruded of an improved PVC virgin pipe compound featuring high impact strength. Confirm to ASTM D-1784 or D-2241 to meet the requirements of cell classification 12454B for pipe. Compound shall have a 2,000 P.S.I. hydrostatic design stress rating.
- d. UVR water pipe shall be manufactured using ASTM G-53 testing for accelerated weathering to resist weakening or corrosion by ultra-violet radiation. Pipe shall be brown colored. UVR water pipe shall use Sch. 40 PVC fittings manufactured of the same material or process as the UVR pipe on which they are used.

Type: Pipe: Pacific Plastics, or approved equal.

- e. Pipe materials shall be used as follows:
  - 1. Mainlines (pressurized) 1-1/2 inch and smaller downstream of backflow unit: Schedule 40 solvent-weld PVC unless otherwise noted.
  - 2. Mainlines (pressurized) 2 inch through 3 inch downstream of backflow unit: Class 315 solvent-weld PVC unless otherwise noted.
  - 3. Lateral lines: Schedule 40 PVC solvent-weld PVC 3/4" and above unless otherwise noted.

## 2. PLASTIC PIPE FITTINGS

- a. Solvent weld pipe, extruded of an improved PVC virgin pipe compound featuring high impact strength. Confirm to ASTM D-1784 or D-2241 to meet the requirements of cell classification 12454B for pipe. Compound shall have a 2,000 P.S.I. hydrostatic design stress rating.
- b. All pipe and fittings shall bear the following markings: Manufacturer's name, nominal pipe size, schedule or class, pressure rating P.S.I., NSF, and date of extrusion.
- c. Make solvent cement joints for plastic pipe and fittings as prescribed by the manufacturer and shall be low-volatile.
- d. All PVC fittings shall be Schedule 40 PVC and shall be injection molded of an approved PVC fitting compound featuring high tensile strength, high chemical resistance, and high impact strength. Fittings shall conform to ASTM D-1784, and meet the requirements of cell classification 12454B. Where threads are required in plastic fittings, these shall be injection molded also.

Type: Spears or approved equal.

- e. All threaded nipples shall be standard weight Schedule 80, with molded threads.
- f. Nipples on pressurized mainline shall be Sch. 80 Thread One End (T.O.E.) with the threaded side attached to the FIPT device and the SLIP end attached to the pressure mainline with a SLIP coupling.
- g. Use 3/4 inch size Teflon tape on all threaded ends.

## 3. COPPER PIPE AND FITTINGS

- a. Copper Pipe shall be Type K, hard tempered, ASTM B88, with fittings of wrought solder joint type in accordance with ANSI B16.22.
- b. Solder joints with silver solder: 45 % silver, 15 % copper, 16 % zinc, 24 % cadmium and solidus as 1125 degrees F. and liquids at 1145 degrees F., conforming to ASTM B206 and FS QQB-655C.

Type: Fittings: Nibco or approved equal.

## 4. BRASS PIPE FITTINGS

- a. Brass pipe shall be 85 % red brass, American National Standard Institute (ANSI), Schedule 40 screwed pipe.
- b. Fittings shall be medium brass, screwed, 125 pound class.

## 5. BACKFLOW PREVENTION UNITS

- a. Backflow prevention unit shall be of the brand, size and type indicated on the irrigation plans.
  - b. Backflow prevention units shall be approved by the Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California.
  - c. Backflow prevention units shall be the reduced pressure principle (RPP) type.
  - d. Backflow assemblies shall be installed using brass ells, unions and nipples.
  - e. Backflow assemblies shall include a 40 mesh bronze wye strainer upstream of the unit.
  - f. Backflow shall be the same size as the water meter. Where dual manifold meters are utilized, each water meter must have a backflow preventer prior to joining the mainline.
6. BASKET STRAINER
  - a. Basket Strainer shall be of the brand, size and type indicated on the irrigation plans.
7. SHUT OFF VALVES
  - b. Shut off valves shall be of the brand, size and type indicated on the irrigation plans.
8. QUICK COUPLING VALVES
  - a. Quick coupler valves shall be of the brand, size and type indicated on the irrigation plans.
  - b. Quick coupling valves shall have a red brass, two-piece body designed for working pressure of 150 P.S.I. with a 1 inch FPT bottom inlet.
  - c. Quick coupler valve shall have a hinge cover constructed of red brass with a leather like vinyl cover bonded to it in a permanent type of cover.
  - d. Quick couplers used with recycled water shall have purple vinyl covers with the appropriate recycled water warnings in English and Spanish, as well as the international "Do Not Drink" symbol and shall have an ACME threaded key.
  - e. Quick coupler valve shall be operated only with quick coupler key, designed for that purpose. Quick coupler key is inserted into the valve and a positive, water-tight connection shall be made between coupler key and valve.
  - f. Locate all quick coupling valves within 12 - 18 inch of walks, curbs, header boards, or paved areas where applicable. Locate quick coupler valves inside shrub and ground cover areas when ever possible. Quick coupling valves shall be installed such that valve top will be 3 inch below the lid of the valve box.
9. MASTER CONTROL VALVES
  - a. Master control valves shall be of the brand, size and type indicated on the irrigation plans.
  - b. The master control valve shall be a switchable normally closed 24 VAC solenoid actuated globe pattern, spring loaded diaphragm type. The valve shall be pressure rated up to 200 P.S.I. and shall have a integral schraeder valve test port.
  - c. The valve shall have a 600 pound test fabric reinforced rubber diaphragm assembly with self-cleaning stainless steel screen.
  - d. The valve shall provide for all internal parts to be removable from the top without disturbing the valve installation.
10. FLOW SENSOR
  - a. An irrigation main-line flow sensor shall be installed in accord with Drawings. See Drawings for location. Contractor shall be responsible for the installation, hook-ups, materials, components, connections, etc., of the flow sensors for the complete automatic operation of the system.
  - b. The flow sensor shall be manufactured by Data Industrial Company. Install as recommended by the manufacturer and as detailed.
  - c. Use Data Industrial 220B brass tee mounted flow sensor for sizes 1" through 1-1/4"
  - d. Use Data Industrial IR-220P plastic tee mounted flow sensor for sizes 1-1/2" through 4" as noted on the drawings.
  - e. All splices shall be performed in a dry splice type connected with an empty tube and gel pack tube of sealant.
11. FLOW SENSOR INTERCONNECT

- a. Flow sensor cable shall be of the brand, size and type indicated on the irrigation plans.
- b. Flow sensor wire may be extended to a maximum distance of 2000 ft. from the location of the assembly to which it is connected. Wire shall be installed in a 1-1/4 in. UL-listed Schedule 40 conduit.
- c. Provide a separate flow sensor cable from each flow sensor to its respective designated controller.

#### 12. REMOTE CONTROL VALVES

- a. Remote control valves shall be of the brand, size and type indicated on the irrigation plans.
- b. The remote control valve shall be normally closed 24 VAC solenoid actuated globe pattern, spring loaded diaphragm type.
- c. The valve shall be pressure rated up to 200 P.S.I.
- d. The valve shall have a 600 pound test fabric reinforced rubber diaphragm assembly with self-cleaning stainless steel screen.
- e. The body and bonnet shall be plastic and the valve shall have a stainless steel control / shut-off stem and manual operator.
- f. The valve shall provide for all internal parts to be removable from the top without disturbing the valve installation.
- g. Install valves in planting areas and according to the construction details. Only one valve per box will be allowed.
- h. Align valve boxes at right angles to adjacent hardscape whenever possible. Where several valve boxes are located in the same area, arrange them in a uniform and orderly fashion.
- i. When grouped together, allow a minimum of 12 inches between valves. The valves shall be installed in valve boxes which will have enough room on all sides of the valves to allow repair personnel to completely reconstruct the valves without removing the valve box.

#### 13. CONTROLLER SATELLITES

- a. All materials furnished and installed shall be new and shall conform to manufacturer's installation instructions and these specifications.
- b. Controllers shall be of the brand, size and type indicated on the irrigation plans.
- c. The controller shall be installed in a stainless steel controller assembly as manufactured by John Deere Green Tech who shall provide the City with a written 5 year Limited Warranty on each complete assembly and a "Certificate of Compliance" certifying that each assembly has been properly installed on the project site.
- d. All irrigation controller and accessory project, as specified, shall be installed in Strongbox top mount stainless steel enclosures.
- e. The controller assembly shall be of a vandal resistant and weather resistant nature manufactured entirely of 304 grade stainless steel.
- f. The main housing door shall be louvered at the bottom and equipped with a tear drop shaped, hollow center thermoplastic door seal.
- g. Filter screen shall cover all louvers to deflect against water spray, insects and dust.
- h. The above described product shall be a NEMA 3R Rainproof Enclosure as listed by Underwriter Laboratories, Inc.

#### 14. LOW VOLTAGE CONTROL WIRING

- a. Connections between the controller and remote control valves shall be made with direct burial UF type wire, installed in accordance with valve manufacturer's wire chart and specifications.
- b. Wire shall be soft drawn bare copper meeting the requirements of ASTM specification B-3 or B-8 10°C +60°C.
- c. Wire shield shall be Polyvinyl chloride, 60°C rated conforming to UL Standards 493 and 83.
- d. Shield shall be surface marked with Paige-Electric, voltage rating, size and type, and UL file number
- e. All cables shall be tested physically and electrically in accordance with UL Standard 493, and 83 (paragraphs 28.1, 29.1 and 29.2). All reels and cartons shall bear UL labels
- f. Wiring shall be installed adjacent to the mainline whenever possible and shall never be installed above or below the pipe.

- g. Where more than one wire is placed in a trench, the wiring shall be taped together using black electrical tape at intervals of 10 feet.

Type: Paige 7001-D

- h. All splices shall be made using sealed waterproof connectors.
- i. An expansion curl shall be provided at all directional changes. Expansion curls shall be sufficient length at each splice connection at each electric control valve, so that in case of repair, the valve bonnet may be brought to the surface without disconnecting the control wires.
- j. Control wires shall be laid loosely in the trench without stress or stretching of control wire conductors. A two (2) foot expansion loop shall be located every 100 feet on continuous wire runs.
- k. Sizing of the lead wire shall be in accordance with irrigation drawings and manufacturer's recommendations, in no case shall the thickness of the wire be less than #14 AWG.
- l. All leads wires to be #14 AWG
- m. All common wire shall be #14 AWG.
- n. Use continuous wire between controller and remote control valves. Under no circumstances shall splices exist without prior approval. Any splices allowed shall be installed in a labeled pull box.
- o. All control wires shall be uniform in color. When more than one controller is installed use a different color wire for each controller.
- p. All common wires and only common wires shall be white in color. When more than one controller is installed use white colored wire with a different color stripe for each controller. Green color shall not be used except for ground wire. Color of the stripe shall match the color of the control wire.

#### 15. WIRE SPLICES

- a. Conductors shall be installed with no underground splices, unless absolutely necessary and unavoidable. Any and all underground splices that are required to be made, must be approved by the Irrigation Consultant, and shall be placed in a suitable type valve box for easy access.
- b. All wire splice boxes shall be noted on the irrigation as-built drawings.

#### 16. VALVE BOXES

- a. Valve boxes shall be used as durable, rigid enclosures for valves or other irrigation system components requiring subsurface protection for installation or maintenance.
- b. The valve box shall be made of structural foam HDPE resin that is resistant to UV light, weather, moisture, and chemical action of soils.
- c. The standard rectangular body shall have knock-outs molded into the sides that can be readily removed. The knock-outs shall remain an integral part of the body unless removed to run pipes or wires through the valve box.
- d. The valve box shall have corrugated sides.
- e. Rectangular valve boxes shall have a grooved feature on one side, just below the lid at the top of the box, for inserting a shovel blade or other prying tool to provide easy lid removal. This is useful following compaction of the surrounding soil or after the eventual accumulation of thatch over the valve box.
- f. There shall be no hole in the valve box lid unless the bolt-hole knock-out is removed in order to use the locking bolt. Lids shall have beveled edges to minimize potential damage from lawn equipment.
- g. Lids shall be clearly marked with the words "Irrigation Control Valve" molded onto the top. Lids shall have a marking area measuring at least 6" by 2" that is suitable for branding or other means of identification.
- h. shall have a marking area measuring at least 6" by 2" that is suitable for branding or other means of identification.
- i. The locking bolt, washer, and clip shall be made of stainless steel.
- j. Valve box types and sizes shall be furnished and installed per the irrigation legends and details.
- k. Valve boxes and covers shall be green in color.
- l. Identification letters or numbers shall be 2 inch high and heat branded onto the box cover. Identification shall be as indicated on the detail drawings.
- m. Heat branding shall be accomplished using branding irons specifically designed for this purpose. Heat branding shall not weaken or in any way puncture the valve box cover.

## 17. SPRINKLER HEADS

- a. Full circle, part circle pressure regulating spray heads and built-in check valve sprinkler heads:
  1. The sprinkler body, stem nozzle and screen shall be constructed of heavy duty plastic.
  2. The sealing device shall create no more than one (1) PSI pressure drop at maximum rated pressure and flow.
  3. The sprinkler shall have a strong stainless steel retract spring for positive pop-down. Pop-up height shall be as indicated on the irrigation drawings and no less than 6 inches.
  4. The sprinkler shall have a screen under the nozzle to protect it from clogging and for easy removal for cleaning and flushing system.
  5. The sprinkler shall be equipped with a built in pressure regulating device capable of regulating an inlet pressure of 35 - 70 PSI to 30 PSI for proper operation of the spray head. The pressure regulating device shall be constructed of stainless steel springs and heavy duty plastic parts.
  6. Pop-up sprinklers shall be equipped with a built in anti-drain valve capable of holding water within the sprinkler head from up to 8 feet of elevation change. The check valve equipped pop-up sprinkler shall be identified on the cap as being so equipped.
  7. The sprinkler shall have a matched precipitation rate (MPR) plastic nozzle with an adjusting screw capable of regulating the radius and flow.
  8. MPR nozzles - The plastic nozzles shall have matched precipitation rates across sets (8 feet, 10 feet, 12 feet, 15 feet). The spray nozzles shall have female thread configuration for use on the 1800 series sprinkler and the PA-8S plastic shrub adapter.
  9. Rotary Nozzles shall have multiple arced streams and have a matched precipitation rate of 0.60 in/hr. The Rotary Nozzle shall be constructed of UV-resistant plastic. The radius adjustment screw shall be of stainless steel.
  10. The Rotary Nozzles shall include a removable .02 x .02 mesh screen to protect the nozzle against clogging. The Rotary Nozzle shall have a precipitation rate matched with Rain Bird 5000/5000 PlusMPR Rotor Nozzles.

## 18. SUBSURFACE INLINE DRIP IRRIGATION TUBING

- a. Drip tubing shall have the following component specifications:
  1. Nominal sized to 17mm (one-half inch) low density, ultra-violet-resistant, linear polyethylene tubing with internal pressure-compensating, self-cleaning, integral drippers spaced at 12 inches.
  2. The low volume tubing shall be capable of a discharge rate of 0.60 gallons per hour (GPH) between operating pressures of 7 to 70 psi for each individual dripper.
  3. The individual self-cleaning, pressure-compensating drippers shall be welded to the inside of the tubing wall.
  4. All inline drip tubing shall be Netafim Techline RW.
  5. All drip tubing shall be buried 5 inch below finish grade and stapled in the trench at four feet on center with drip tubing stakes.
  6. Maximum radius for tubing bends shall be 3 feet or greater. Smaller bends or immediate changes in direction in drip tubing shall only be made with insert barb fittings. A tubing stake shall be used at each barbed fitting for changes in direction.
  7. Maximum flow for inline drip irrigation systems is 12 gallons per minute.
  8. Netafim Techline RW shall be installed with Netafim TLAVRV air/vacuum relief valves at the high point of each drip irrigation zone to expel air during pressurization and draw air during valve closing.
- b. All insert barbed fittings shall be constructed of molded, ultra-violet-resistant, brown colored plastic having a nominal inside dimension (I.D.) of 0.57" (17 mm). Each fitting shall have a minimum of two ridges or barbs per outlet. All inline drip tubing fittings shall be Netafim.
- c. Non-pressure supply and exhaust headers shall be rigid polyvinyl chloride PVC 1220, (Type 1, Grade 2), Schedule 40 PVC with Schedule 40 PVC fittings.

- d. Drip filtration unit shall include a Pressure Regulating Quick Check Basket Filter that combines filtration and pressure regulation in one integrated unit for protection of downstream components of drip irrigation system. Pressure regulating basket filter shall be Rainbird PRF-QKCHK-140 mesh with component specifications to include:
  - 1. Basket style body and jar-top cap constructed of heavy-duty glass-filled, UV-resistant polypropylene, with 150 PSI operating pressure rating.
  - 2. Indicator incorporated into filter cap that changes color from green to red during operation when the filter element requires cleaning.
  - 3. Standard 200 mesh filter screen constructed of stainless steel attached to propylene frame. Screen is serviceable for cleaning purposes by unscrewing cap from filter body and removing filter element.
  - 4. Normally-open in-line pressure regulating device, constructed of durable, UV resistant non-corrosive material able to accommodate an inlet pressure rating of not less than 150 PSI, with preset outlet pressure of approximately 40 PSI. Pressure regulating device allows full flow with minimal pressure loss unless inlet pressure is greater than preset level. As inlet pressure increases above preset level, internal spring compresses to reduce downstream pressure.
  - 5. Male threaded 1" inlet and outlet connections.
- e. All inline drip tubing systems shall have a Schedule 40 PVC ball type manual flush valve at each isolated zone within the system to allow water to be drawn through all the tubing during flush operation. Multiple flush valves may be necessary per drip valve zone, refer to plan for locations.

#### 19. CHECK VALVES

- a. Provide check valves and/or anti-drain valves as may be required by the Irrigation Consultant to prevent drainage of irrigation water from sprinkler system due to changes in elevation.
- b. Anti-drain valves shall be of heavy duty virgin PVC construction with F.I.P. thread inlet and outlet. Internal parts shall be stainless steel and neoprene. Anti-drain valve shall be field adjustable against drawout from 4 to 32 feet of head.

Types: Hunter HCV or approved equal

#### 20. MISCELLANEOUS EQUIPMENT

- a. Thrust Blocks: Thrust blocking shall be used on all gasketed type mainline. Thrust blocks shall be minimum 1 cubic foot of 470-C-2000 type 5 concrete. All PVC pipe fittings shall be wrapped with black plastic tape prior to installation of thrust blocks.
- b. Gravel: All gravel used in valve boxes shall be washed crushed gravel of approximately 3/4 inch size. No pea gravel shall be used.
- c. Identification tags with numbers are required on all valves.

Type: Christy Tags (yellow background with black lettering)

- d. Swing Joint Assemblies: All sprinklers shall be installed with triple swing joints. Assembly shall be sized per the sprinkler inlet, with a 6 inch minimum lay length. 1/2" swing joints shall be made with marlex street ells. 3/4" and larger swing joints shall be made with Sch. 40 PVC street ells.

### EXECUTION

#### 1. INSPECTION SCHEDULE

- a. Contractor is responsible for notifying the Irrigation Consultant 48 hours in advance for on-site meetings and observations.

- b. As-built drawings must be submitted to the Irrigation Consultant for approval prior to site inspection; no inspection will commence without as-built drawing approval.
- c. When performing the irrigation coverage test, the contractor shall be responsible for having a two-way communication system or sufficient personnel, so that the directions from the inspection area to the controller of the system can be readily accomplished.

## 2. WATER SUPPLY

- a. Utilize water meter and provide connections to backflow prevention unit per the irrigation drawings and details.
- b. Connections to the existing water meter shall be at the approximate locations shown on the drawings. Minor changes caused by actual site conditions shall be made without additional cost to the City.
- c. Any R.P. backflow prevention unit shall be tested by a certified backflow prevention technician and its operation certified in writing. Landscape Contractor is to arrange and pay for all testing and certification fees. The original written certification of the backflow prevention unit is to be submitted to the Irrigation Consultant.

## 3. LAYOUT

- a. Lay out irrigation heads and make any minor adjustments required due to differences between site and the drawings. Any such deviations in layout shall be within the intent of the original drawings and approved by the Irrigation Consultant.
- b. Lay out all irrigation equipment using an approved staking method, and maintain the staking of approved layout.
- c. All layouts in deviation of the design intent shall be approved by the Irrigation Consultant prior to equipment installation.
- d. Before starting work on irrigation system, determine that work may proceed without disruption of activities of other trades.
- e. The contractor shall carefully check grades to ensure that the area is safe to begin work.
- f. Contractor is responsible for taking all reasonable investigative actions and precautions, when working around any utility system. Underground Service Alert shall be utilized where possible.
- g. Contractor shall be responsible for verification of site conditions and minor revisions as approved by the Irrigation Consultant to insure 100% irrigation coverage in all areas.

## 4. ASSEMBLIES

- a. Routing of irrigation lines as indicated on drawings is diagrammatic. Install lines (and various assemblies) to conform to details on plans. Whenever possible, place all irrigation gate valves, remote control valves, quick couplers, pull boxes, etc. in the shrub planting areas. Irrigation elements drawn in hardscape areas on the plans are for graphic clarity only and intended to be placed in shrub planting areas.
- b. Do not install multiple assemblies on plastic lines. Provide each assembly with its own outlet.
- c. Install all assemblies specified herein according to the respective detail drawings or specifications, using the best standard practices with prior approval.
- d. Assemble brass pipe / fittings and plastic pipe / threaded fittings, using Teflon tape applied to the male threads only.
- e. Install concrete thrust blocking per detail on all mainline with gasketed pipe.

## 5. LINE CLEARANCE

- a. All lines shall have a minimum clearance of 4 inches from each other and 24 inches from lines of other trades.
- b. Do not install parallel lines directly over one another.

## 6. TRENCHING

- a. Dig trenches and support pipe continuously on bottom of trench. Lay pipe to an even grade. Pipe shall be snaked from side to side to allow for expansion and contraction. Trenching excavation shall follow layout indicated and as noted.
- b. Refer to details for trenching and pipe installation under paving dimensions.

7. BACKFILLING

- a. Initial backfill on all lines shall be of a fine granular material, not larger than 1/2 inch diameter.
- b. Compact backfill to dry density equal to 95% compaction, conforming to adjacent grades without dips, sunken areas, humps, or other irregularities.
- c. In appropriate types of soil, the Irrigation Consultant may authorize the use of flooding in lieu of tamping.
- d. Under no circumstances shall vehicle wheels be used for compacting soil.
- e. Provide sand backfill a minimum of 4 inches over and under all piping under paved areas, and a minimum of 2 inches on all other piping.
- f. If settlement occurs and subsequent adjustments in pipe, valves, irrigation heads, turf or other plantings, or other construction are necessary, the contractor shall make all required adjustments without cost to the City.

8. FLUSHING THE SYSTEM

- a. After all irrigation pipe lines and risers are in place and connected, and prior to installation of irrigation heads, the control valves shall be opened and a full head of water used to flush out the system.
- b. Sprinkler heads shall be installed only after flushing of the system has been accomplished to the complete satisfaction of the Irrigation Consultant.

9. UNDER EXISTING AND/OR PROPOSED PAVEMENT:

- a. Trenches located under areas where paving, asphaltic concrete or concrete will be installed shall be backfilled with sand and compacted in layers to 95 % compaction, using manual or mechanical tamping devices. Trenches for piping shall be compacted to equal the compaction of the existing adjacent undisturbed soil and shall be left in flush with the adjoining grade. The irrigation contractor shall set in place, cap and pressure test all piping under paving prior to paving work.
- b. Piping under existing pavement may be installed by jacking, boring, or hydraulic driving. However, no hydraulic driving will be permitted under asphalt paving.
- c. Provide a minimum cover of 18 inches between the top of the pipe and the bottom non-pressure piping (laterals) installed under asphaltic concrete paving.
- d. Sleeves shall be two times the diameter of lateral line, mainline, and wire bundle size, and a minimum of 2 inch size. Install separate sleeves for each use.
- e. Under public roads, all mainlines and lateral piping must have a minimum cover of 36 inches from the top of the pipe to the bottom of aggregate base or per local code.
- f. Secure permission from the Irrigation Consultant before cutting or breaking existing pavement. All necessary repairs and replacements shall be approved by the Irrigation Consultant and City's authorized representative at no additional cost to the City.

10. CONTROLLER

- a. The contractor shall install a new controller as specified on the irrigation drawings.
- b. Controller shall be installed in the locations indicated on the irrigation drawings and approved by the Irrigation Consultant.
- c. Contractor shall install separate sleeve conduits for phone line, control wiring, ground wire and electrical power wires as required.
- d. Controller shall be installed in shrub areas only.
- e. Install controller per local electrical code.

11. IRRIGATION HEADS

- a. Install irrigation heads as indicated on the irrigation drawings.

- b. Spacing of heads shall not exceed the maximum indicated. In no case shall the spacing exceed the maximum recommended by the manufacturer.
- c. Heads along curbs, walks, paving, etc., shall be placed 1/2 inch above finish grade.
- d. Final sprinkler head heights shall be as indicated on the irrigation detail drawings. All sprinkler heads installed adjacent to hardscape features shall be located min. 4 inches off the edge of the hardscape feature for turf and 6 inches for shrub heads.
- e. All irrigation heads shall be set perpendicular to finish grades unless otherwise indicated on the plans.

12. ADJUSTING THE SYSTEM

- a. The contractor shall flush and adjust all irrigation heads and valves for optimum performance and to eliminate over spray onto walks, roadways, buildings, walls and other structures.
- b. If it is determined that adjustments in the irrigation equipment or nozzle changes will provide proper and more adequate coverage, make all such changes or make arrangements with the manufacturer and Irrigation Consultant to have adjustments made, prior to any planting.

13. COVERAGE TEST

- a. When the irrigation system is completed, perform a coverage test in the presence of the Irrigation Consultant to determine if the water coverage for turf, planting and slope areas is complete and adequate.
- b. Coverage must be 100 % head-to-head and accepted by the Irrigation Consultant. Furnish all materials and perform all work required to correct any inadequacies of coverage due to deviations from the plans or where the system has been willfully installed as indicated in the drawings, when it is obviously inadequate or inappropriate, without bringing this to the attention of the Irrigation Consultant. This test shall be accomplished before any plant material is planted (excluding trees).

14. TESTS

- a. All piping under paved areas shall be tested under a hydrostatic pressure of 150 PSI and approved watertight, prior to the paving operation. Make hydrostatic tests only in the presence of the Irrigation Consultant and Water District Inspector. No pipe shall be backfilled until it has been inspected, tested, and approved in writing. Allow 48 hours lead time for pressure testing inspections.
- b. Furnish necessary force pump and all other test equipment.
- c. Test all pressure mainlines under a hydrostatic pressure of 150 PSI for a period of four hours.
- d. All testing shall be approved prior to the installation of remote control valves, quick couplers, or other valve assemblies.

15. MAINTENANCE

- a. The entire irrigation system shall be under full automatic operation for a period of seven days prior to any planting or hydroseeding (excluding trees).

16. COMPLETION CLEANING:

- a. Upon completion of the work, make ground surface-level, remove excess materials, rubbish, debris, etc., and remove construction and installation equipment from the premises.

**END OF SECTION**

SECTION 02900 - EXTERIOR PLANTINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. General: Provide Exterior Plantings in accordance with Contract Documents 1. Drawings and general provisions of the Contract Documents, including General Conditions and Divisions 1 Specification Sections, apply to this Section.
- B. Related Work Specified Elsewhere:
  - 1. Grading - Refer to Drawings.
  - 2. Section 02810 - Irrigation System
- C. Summary of Work: This Section includes the following:
  - 1. Contractor shall furnish all labor, material, equipment, and services necessary to install all landscape planting as indicated on the approved plans and as specified herein, and shall perform all other incidental work necessary to accomplish the intent of this specification and the approved plans including the following:
    - a. Trees, Shrubs, Vines, Ornamental Grasses, and Herbaceous Plants
    - b. Fertilizers, and Mulches
    - c. Staking, guying, tying, and trunk guards
    - d. Pest and disease control
    - e. Maintenance under contract and guarantee
  - 2. Installation of Owner-Furnished Trees: Contractor's responsibilities include, but are not limited to, the following:
    - a. Review of plant material at grower and that the contractor will accept the plant material when trees are off loaded at site.
    - b. Delivery Schedule.
    - c. Shipping Cost.
    - d. Off Loading
    - e. Receivership at off loading.
    - f. Acceptable holding/storage yard with water and adequate protection (shade).
    - g. Planting.
    - h. Maintenance.
    - i. Warranty as described in specifications.

1.2 REFERENCES

- A. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:
  - 1. ANSI Z60.1 "American Standard for Nursery Stock"
- B. Where the language in any of the documents referred to herein is in the form of a recommendation or suggestion, such recommendation or suggestion shall be deemed to be mandatory under this Contract.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Condition of the Contract and Division 1 Specified Sections.
  - 1. Product Data for each type of product indicated.

2. Label Data substantiating that planting material comply with specified requirements.
  3. Schedule indicating anticipated dates and locations for each type of planting. This schedule shall be submitted within 3 calendar days after Contract Notice to Proceed. Include in this schedule anticipated dates from commencement and sequencing of planting operations, including but not limited to selections and tagging, layouts and layout approval, placement of tree, and commencement of maintenance period.
  4. Plant Submittals Shall Include: Submittal sources and photographs of actual trees and all other plant materials to be used on the project for review and approval by Landscape Architect.
  5. Mulch: Submittal of 3 pound bag of material for approval by Landscape Architect.
  6. Planting Soil: Submittal of 3 pound bag of each type of material specified for approval by Landscape Architect.
- B. Material Certificates: Chain-of-custody certificates certifying that wood products comply with forest certification requirements. Include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed landscaping work similar in material, design, and extent to that indicated for this Project and with a record of successful landscape establishment.
- B. Installer's Field Supervision: Require installer to maintain an experienced fulltime supervisor on the Project Site during times landscaping is in progress. Supervisor shall not be changed, except with consent of the Landscape Architect. Supervisor shall represent contractor in contractor's absence, and all direction given to supervisor shall be as binding as given to Contactor.
- C. Nursery Stock Standards: Provide quality, size, genus, species, and variety of trees indicated, complying with applicable requirements of ANSI Z60.1 "American Standard for Nursery Stock".
  1. Selection of plant material will be made by Landscape Architect (at Landscape Architect's discretion), who will tag plants at their place of growth before they are prepared for transplanting.
- D. Measurements: Measure trees according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6 inches above ground for trees up to 4 - inch caliper size, and 12 inches above ground for larger sizes. Measure main body of tree for height and spread; do not measure braches or roots tip to tip.
- E. Applicable Laws: Meet requirements of applicable laws, codes, and regulations required by authorities having jurisdiction over Work.
- F. Verification of Dimensions and Quantities: All scaled dimensions are approximate. Before proceeding with any work, carefully check and verify all dimensions and quantities. Immediately inform Owner of all discrepancies between drawings, specifications, and actual conditions. Do not work in any area where there is a discrepancy until approval to proceed has been received from Owner.
- G. Forest Certification: Except for mulch and similar recycled wood-based materials and products, provide wood products obtained from forest certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship".

- H. Reuse of Nursery Boxes: Containers for plant materials must be reused by plant material supplier or source for new plantings of similar type provided for the Work. Recycling plant containers by remanufacturing (or similar processes) for other uses or landfill (or similar type) disposal is not acceptable.
- I. Installation of Owner-Furnished Trees:
  - 1. Arrange and pay for delivery of Owner-furnished trees.
  - 2. Coordinate delivery dates of Owner-furnished trees in Contractor's construction schedule.
  - 3. Review Contract Documents and other information and notify Owner of discrepancies or anticipated problems in installation or Owner-furnished trees.
  - 4. If Owner-furnished trees are damaged as a result of Contractor's operations, Contractor shall be responsible for repair or replacement.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at site. The Contractor shall furnish standard products in manufacturer's standard containers bearing original labels showing quantity, analysis, and name of manufacturer. All containers and bags shall remain on site until work is completed.
- B. Stockpiling: Soil, mulch, or amendment materials, stored on Project Site temporarily in stockpiles prior to placement shall be protected from intrusion of contaminants and erosion. All stockpiled materials shall be placed on tarpaulin, heavy polyethylene sheeting or other suitable barrier to protect paving surfaces from staining or soiling by stockpiled materials. All temporary storage means and methods shall be approved by Construction Manager and Landscape Architect.
- C. Inspection:
  - 1. Plants shall be subjected to inspection and / approval by Landscape Architect (at Landscape Architect's discretion) at the place of growth and again upon delivery and prior to planting for conformity to specification requirements as to quality, size and variety. Such approval shall not impair the right of rejection due to damage suffered in handling, transportation and/or planting. Rejected plants shall be removed immediately from the Project Site. Inspection by Landscape Architect outside the City of Torrance beyond a 90-mile radius from the Project Site shall be made at the expense of the Owner's Park Developer. A Contractor's representative shall be present at all inspections at the Contractor's expense.
  - 2. Written requests for inspection of plant material at their place of growth shall be submitted to Landscape Architect at least 3 days prior to delivery along with submittal of photographs of plants to be inspected. The Landscape Architect may refuse inspection if in his/her judgment a sufficient quantity or quality of plants is not available for inspection. The Contractor shall, at his own expense, supply the Landscape Architect with such labor and assistance as may be necessary in the handling of material for proper inspection.
  - 3. Tagging of trees shall be as follows: for every 20 trees planted, 22 trees will be tagged assuring appropriate replacement for (a) trees damaged prior to transplanting, and (b) trees requiring replacement under terms of the one-year warranty.
  - 4. Reject all materials, prior to planting, that are found unacceptable, and coordinate alternate selections with Landscape Architect. Owner warrants that all Owner-furnished trees and shrubs from outside vendors will be released to Contractor in viable condition. Should Contractor take exception, if taken shall be accompanied by documentation of purported defect and or malady from a recognized authority or expert, at no additional cost to Owner.
- D. Trees and Shrubs:
  - 1. Do not prune before delivery, except as approved by Landscape Architect. Protect bark, branches, and root systems from sun-scald, drying, sweating, whipping, and other handling and

trying damage. Do not bend trees and shrubs in such a manner as to destroy natural shape. Provide protective covering during delivery.

2. Deliver trees after preparations for planting have been completed and install immediately. If planting is delayed for more than 6 hours after delivery, set planting materials in shade, protect from weather and mechanical damage, and keep roots moist. Notify Contractor and Landscape Architect three (3) days prior to delivery of trees. Do not deliver more trees and shrubs than can be planted in one day. It is not permissible to retail unplanted trees and shrubs on-site overnight.

3. Water as often as necessary to maintain root systems in a moist condition.

E. Ornamental Grasses and Herbaceous Material

1. Deliver healthy container plants. Do not prune before delivery, except as approved by Landscape Architect. Protect plant and root from sun-scald, drying, sweating, whipping, and other handling and tying damage. Provide protective covering during delivery. Do not drop ornamental grasses and herbaceous material during delivery. 2. Deliver ornamental grasses and herbaceous material after preparations for planting have been completed and install immediately. If planting is delayed for more than 6 hours after delivery, set planting materials in shade, protect from weather and mechanical damage, and keep roots moist. Do not deliver more ornamental grasses and herbaceous material than can be planted in one day. It is not permissible to retain unplanted ornamental grasses and herbaceous material on-site overnight.

3. Water as often as necessary to maintain root systems in moist condition.

1.6 PROJECT CONDITIONS

A. Utilities: Determine location of in-planter utilities including lighting, irrigation and drainage in planting areas; and perform work in a manner, which will avoid damage. Hand excavate, as required.

B. Waterproofing: Perform work in a manner, which will avoid damage to planter waterproofing membrane, protection board or other structural sealing materials.

C. Mechanical Lifting: The Contractor shall be responsible for lifting plant material, planting soils and other required material to planter areas for planting through exterior means or lifts as approved by the Contractor and Landscape Architect.

D. Safety: The Contractor shall be responsible for pedestrian and vehicular safety and control within the Project Site. He/she shall provide the necessary warning devices and ground personnel needed to give safety, warning and protection to persons and vehicular traffic within the area.

E. Environmental Requirements and Planting Schedule: Plant weather permits. Do not plant when the ground is frozen, excessively wet, or the soil is otherwise in an unsatisfactory condition for planting.

F. Clean-Up: Upon completion of each phase of work under this section, the Contractor shall clean and remove from the area all unused materials and debris resulting from the performance of the work. All paved areas and walks within the project site shall be left in a clean and safe condition.

1.7 WARRANTY

A. Warranty: Warrant all planting materials, for the warranty period indicated, against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, abuse by Owner or Owner's Park Developer, abnormal weather conditions unusual for warranty period, or incidents that are beyond Contractor's control.

1. All plant material (included shrubs and groundcover cover) for a period of one year after the date of Substantial Completion.

2. Remove and replace dead planting materials immediately unless required to plant in the succeeding planting season.
3. Replace planting materials that are more than 25% dead or in an unhealthy condition at end of warranty period.
4. A limit of one replacement of each plant material will be required, except for losses or replacements due to failure to comply with requirements.

#### 1.8 PLANT MAINTENANCE

- A. Maintain trees, shrubs and herbaceous plantings by pruning, cultivating, watering, weeding, fertilizing, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Restore or replace damaged tree wrappings. Maintain trees, shrubs and herbaceous plantings for the following period: 90 days following Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 TREES, SHRUBS, AND VINES

- A. General: Furnish nursery-grown trees, shrubs and herbaceous plants conforming to ANSI Z60.1 with healthy roots systems developed by transplanting or root pruning. Provide well-shaped, fully-branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasion, and disfigurement.
  1. Grade: Provide trees, shrubs and herbaceous plants of sizes and grades conforming to ANSI Z60.1 for type of tree required. Trees, shrubs and herbaceous plants of a larger size may be used if acceptable to Landscape Architect, with proportionate increase in size of roots or balls or containers.
  2. Species: All trees, shrubs and herbaceous plants shall be true to species and cultivar specified. Certification of cultivars by supplying nursery must be supplied in writing to Contractor and Landscape Architect.
  3. Labels: Label at least 1 tree, shrub or herbaceous plant of each variety and size with a securely attached, waterproof tag bearing legible designation of botanical and common name. Field Tags by Landscape Architect shall not be removed until so directed by Contractor and Landscape Architect.
  4. Single Stem Trees: Single-stem trees with straight trunk, well-balanced crown, and intact leader, of height and caliper indicated, conforming to ANSI Z60.1 for type of trees required.
  5. Branching Height: For single-stem trees branching height shall be 5'-0" and not more than y, tree height or as required by Landscape Architect or indicated on the Drawings. Limbing up shall not deform natural form of the tree.
  6. Multiple-Stem Trees: Multiple-stem trees with multiple basal or low branched stems, and well-balanced crown, of height and caliper indicated, conforming to ANSI Z60.1 for type of trees required. Unless specified otherwise multiple-stem trees shall have 3 to 5 stems minimum.
  7. Depth of Planting: The depth of planting must be checked for all trees being tagged at the nursery. If the root/trunk flare is not visible, the root/trunk (the intersection of the trunk and the buttress roots) must be located. Any tree with significant adventitious root growth or evidence of girdling roots shall be subject to rejection by Landscape Architect on a case by case basis. Any soil above the root/trunk flare shall be removed prior to digging. After the removal of any excess soil above the root/trunk flare, the tree shall be hand dug and drum laced.
  8. Container Grown Material: Container grown shrubs and herbaceous plants shall be nursery grown, conforming to ANSI Z60.1. Shrubs shall be healthy, vigorous, well rooted, fully branched, symmetrical, and well formed, Container stock shall have well developed fibrous roots, so that the root mass will retain its shape and hold together when removed from the container. Container plants shall not be root bound.

9. Plugs: Plugs shall be nursery grown, conforming to ANSI Z60.1 and shall be healthy, vigorous, well rooted, fully branched, symmetrical, and well formed. Plugs shall have well developed fibrous roots, so that the root mass will retain its shape and hold together when removed from the container. Container plants shall not be root bound.

10. Substitution: Substitution by Contractor shall not be permitted.

11. Ornamental Grasses and Herbaceous Material Sources: Ornamental grasses and herbaceous material shall be provided by grower specializing in Ornamental Grass and Herbaceous plant production.

12. Sources: Unless otherwise specified all plant materials shall be from a well established Southern California region grower or nursery. Plants shall come from the following sources:

a. GENERAL NURSERIES:

Sources:

Pacific Coast Nursery  
1924 Monroe St.  
Riverside, CA 92504  
Tel: (951) 689-1777  
Fax: (951) 689-1640

Norman's Nursery  
8665 Duarte Road  
San Gabriel, CA 91775  
Tel: (626) 285-9795  
Fax: (626) 287-2352

Tree of Life Nursery  
33201 Ortega Highway  
San Juan Capistrano, CA 92675  
Tel: (949) 728-0685  
Fax: (949) 728-0509

Or approved equal

2.2 MULCHES

A. General: Mulch to be no more than 3" Shredded Walk On Bark Mulch:

1. Sources:

R&S Soil Product, (949)-830-8884  
Aguinaga Fertilizer Company  
7992 Irvine Blvd.  
Irvine, CA 92618  
(949) 786-9558

Or Equal as approved by the City.

2.3 FILTER FABRIC BARRIERS

A. All filter fabric shall be synthetic and rot proof.

B. Non-Woven, UV stabilized, polypropylene geo-textile shall be 140 NL as manufactured by Mirafi 718-461-2200, or approved equal.

2.4 TREE BRACING

A. Stakes: Straight grained lodge pole pine free of knots, splits, checks or disfigurements. Stakes shall be 2 inch minimum nominal size in diameter and 10 feet

length, or as required by tree height. Stakes shall have a 10 inch tapered driving point.

1. Support: Supports for staking shall be (2) Cinch Ties by:
  - a. VIT Co.  
2063 Wineridge Pl  
Escondido, CA 92029-1931
  - b. Or equal.
- B. Guy and Tie Wire: No. 10 Gauge Galvanized Wire with:
  1. Protective Rubber Collar.
  2. Galvanized Turnbuckle
  3. 1/2" diameter X 48" minimum length white PVC Schedule 40 Tubing
  4. 2" diameter X 24" long, 15 Gauge Iron Pipe Stake. Drive flush with grade. Drill (2). 5/16" holes 3/4" from top to secure wire 2.5

## 2.5 LANDSCAPE EDGING

- A. Aluminum Landscape Edging: 3/16" X 4", 0.072" thick with 0.135" exposed top lip, Mill Finish.
  1. Sources:
    - a. Permaloc Clean - Permaloc Corporation 13505 Barry Street Holland, MI, 49424.  
Tel. (800) 356-9660, [www.permaloc.com](http://www.permaloc.com)
    - b. Sureloc Aluminum/Steel Edging, which is located at: 494 E. 64<sup>th</sup> St. ; Holland, MI 49423; Toll Free Tel: 800-787-3562; Tel: 616-392-3209; Fax: 616-392-5134; Email: [info@surelocedging.com](mailto:info@surelocedging.com); Web: [www.surelocedging.com](http://www.surelocedging.com)
  - c. Or equal.

## 2.6 TRUNK GUARD:

- A. Recycled content, polyethylene with ultraviolet inhibitors; 0.060-inch thick x 9-inches high x length for up to 4-inch diameter trunk.
  1. Products:
    - a. Arborgard+ AG 9-4; Dimex LLC, 28305 State Route 7, Marietta, OH 45750, (800) 334-3776. (740) 374-3100.
    - b. Or equal.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas to receive plantings for compliance with requirements and for conditions affecting performance of Work in this Section.
- B. Utilities and Structures located in planting areas. Verify that the locations of lighting, drainage and irrigation utilities, structures and other underground items have been clearly marked.
- C. Sequencing: Do not commence planting until site fine grading, soil import, and preparation has been completed and improved by Owner. Endure all drainage swales and flow lines have been established and accepted prior to planting.
- D. Inspect and approve all sprinkler work and finish grading prior to the start of shrub and ground cover planting as specified. Trees may be planted in advance of landscape

irrigation system installation, provided approval by the Landscape Architect and that adequate provision is made in advance for interim watering.

- E. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Protect structures, utilities, waterproofing, drainage structures, planter structures, pavements, and other facilities, and existing trees to remain from damage caused by planting operations. This includes maintaining all protective barriers in place unless directed otherwise by Owner. Vehicles and equipment shall not be parked, serviced, permit burning or operated within drip line of existing trees or within newly planted areas.
- B. Remove existing plant materials and planting soils which are designated for removal in the documents.
- C. Do not remove, sever or impact root structures of existing trees to remain in the preparation of sub-grade tree pit conditions. Conflicts with existing tree roots shall be brought to the attention of the Landscape Architect who may alter the required configuration to preserve or protect tree roots as they exist
- D. Test drainage structures and verify working condition. Verify acceptable condition to protection boards and other waterproofing components and notify Landscape Architect of any damage.
- E. Weed Control: Before and during preliminary and finish grading, dig out all weeds and grasses by roots and dispose of off-site. Prior to planting, eliminate any weeds present in delivered plant stock. Unless otherwise instructed by Owner. Grasses not of perennial type, except for Torpedo Grass and Nut Grass, less than 2-112" high and not bearing seeds, may be turned under. Perennial weeds and grasses to be removed include, but are not limited to, the following:
  - a. Nut Grass
  - b. St Augustine
  - c. Puncture Vine
  - d. Morning Glory
  - e. Dog Fennel
  - f. Torpedo Grass
  - g. Common Bermuda Grass
  - h. Kikuyu Grass

Remove other noxious or invasive weeds.

Site shall be maintained weed-free throughout planting operations and until final acceptance by Owner. Submit a weed control program to Owner for approval within 3 days afterward of Contract and prior to starting of work. Include all product information and frequency of weed control operations.

### 3.3 TREE PLANTING

- A. Layout individual tree locations and areas for multiple plantings. Trees shall be staked prior to planting shrubs, grasses, and herbaceous plants in order to establish the planting structure of the site. Stake locations, adjust locations when requested, and secure Landscape Architect's acceptance before the start of planting work.
- B. After digging plant hole but prior to installing tree, install Enhanced Soil Drainage according to Planting Soil specifications.

- C. Tree root-ball shall be firmly placed on compacted setting bed and established at correct location, elevation and in plumb upright condition. Use temporary guy wires to secure tree in place as required during planting soil placement, to maintain proper setting location. Tree root ball must be set at finish grade so that the original root/trunk flair is at the proper relationship to finished planting soil grade.
- D. All ropes and strings must be cut, non-biodegradable material must be *removed* and burlap folded back from the top one-quarter of root-ball. Do not *remove* burlap from lower sides or under root ball. Do not use planting stock if root-ball is cracked or broken before or during planting operation.
- E. Only when placement of trees has been approved by Landscape Architect may back-fill planting soil be placed in excavated areas around root ball. Do not make saucer indentations.
- F. Back-fill planting soils shall be placed in uniform six to eight inch lifts. Soil must be firmed at each lift interval by hand tamping as required to settle back fill and eliminate voids and air pockets.
- G. Staking and Guying: Provide staking per Drawings.
- H. Water thoroughly after planting, taking care not to *cover* plant crowns with displaced wet soil. Adjust finish grades and reset plants if settlement occurs. Place mulch and repeat watering procedure.
- I. Wrap the trunks of trees immediately after planting with specified trunk guard material at base of tree. Uncoil and place around base of tree. Ensure complete protection with flared end in contact with ground. For larger trunk diameters, couple multiple sections together, securely interlocking tabs as recommended by manufacturer.

#### 3.4 SHRUB AND HERBACEOUS PLANTING

- A. Layout individual shrubs, grasses and herbaceous plants for multiple planting areas only after the location of trees *have* been planted. Shrub, Grasses, and Herbaceous groupings shall be marked out on the ground to establish the zones into which these plantings are to be planted. Once the zones are established individual shrubs, grasses and herbaceous plants shall be placed according to specified spacing and layout as indicated on drawings. Stake locations, outline area, and secure Landscape Architect's approval before starting planting. Make adjustments to layout as directed by Landscape Architect.
- B. Landscape Architect may request a full temporary placement of plants, still in their pots, according to plan or as directed for inspection by Landscape Architect prior to commencing with planting operation. Landscape Architect may adjust planting layout and spacing at his discretion during the planting operation.
- C. Dig holes large enough to allow spreading of roots, and backfill with planting soil. Work soil around root ball to eliminate air pockets. Do not make saucer indentations.
- D. Water thoroughly after planting, taking care not to cover plant crowns with displaced wet soil. Adjust finish grades and reset plants if settlement occurs. Place mulch and repeat watering procedure.

#### 3.5 BOX TREE PLANTING

- A. All materials for box tree planting shall be on site prior to start of installation. After pavement treatment has been completed and approved by Landscape Architect, mark locations of boxes, adjust locations when requested, and secure Landscape Architect acceptance before moving boxes to final location. Review tree type with box location for approval by Landscape Architect prior to planting.
- B. During planting process Contractor responsible to keep paving and other site amenities clean.
- C. Tree root-ball shall be firmly placed on compacted setting bed and established at correct location, elevation and in plumb upright condition. Use stakes to secure tree in place as required during planting soil placement, to maintain proper setting location. Tree root ball must be set at finish grade so that the original root/trunk flair is at the proper relationship to finished planting soil grade. Planter soil levels shall be below top of planter box:
  - a. 3" below for 36" box
  - b. 3" below for 60" box trees and Greater
- D. Only when placement of trees has been approved by Landscape Architect may planter soil be placed in areas around root ball. Do not make saucer indentations.
- E. Planter soils shall be placed in uniform six to eight inch lifts. Soil must be firmed at each lift interval by hand tamping as required to settle back fill and eliminate voids and air pockets.
- F. Staking and Guying: Provide staking per Drawings.
- G. Water thoroughly after planting, taking care not to cover plant crowns with displaced wet soil. Adjust finish grades and reset plants if settlement occurs. Place mulch and repeat watering procedure.

### 3.6 MULCH PLACEMENT

- A. Place shredded bark mulch at areas indicated in the drawings. Protect planting material from damage during and after installation of mulch.
- B. Place aggregate mulch; refer to Section 02738, at locations indicated in the drawings. Protect planting material from damage during and after installation of mulch.

### 3.7 INITIAL PRUNING

- A. Contractor shall prune trees and shrubs as directed by Landscape Architect and according to the Contract Documents
  - 1. Prune, thin and shape trees and shrubs according to standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise directed by Landscape Architect, do not cut tree leaders; remove only injured or dead branches.

### 3.8 CLEAN-UP AND PROTECTION

- A. During landscaping keep pavements clean and work area in orderly condition. Protect landscaping from damage due to landscape operations, operations by other contractors and trades and trespassers. Treat, repair or replace damaged landscape work as directed.

### 3.9 DISPOSAL OF SURPLUS AND WASTE MATERIALS

Land Concern, Ltd.  
Project # TOR009

555 Maple Ave.  
Torrance, CA

- A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil. Tree boxes, Trash, and debris, and legally dispose of it off of the Owner's property.

3.10 FINAL INSPECTION AND FINAL ACCEPTANCE

- A. At the end of the warranty period the Landscape Architect and Owner will inspect all warranted work at the written request of the Contractor. The request shall be received 10 calendar days before the anticipated date for Final Inspection.

END OF SECTION 02900

SECTION 02935 - MAINTENANCE OF PLANTING  
PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes maintenance of planting.
- B. Related Sections:
  - 1. Division 2 Section "Amending Planting Soils" for requirements related to amending subgrade planting soils.

1.02 SUBMITTALS

- A. Product Data: For each type of product indicated.
  - 1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this project.
- B. Work Plan: Submit a work plan describing sub-grade preparation and maintenance procedures prior to performing work.
  - 1. Include detailed description of methods, equipment, and accessory/supplementary materials used for each specific operation and sequence of operations.
    - a. Delineate methods for sub-grade preparation and maintenance procedures.
    - b. Include detailed description of procedures to compensate for changes in construction schedule milestones.
  - 2. Include description of interfacing with other trades, and sequencing of related work.
  - 3. Include schedule when sub-grade preparation operations will be performed.
    - a. Indicate, by day, when specific sub-grade preparations are to be performed. Note other activities affecting or affected by the work of this section, including Owner's installation of turf sod, relative to sub-grade preparation schedule milestones.
- C. Qualification Data: For qualified landscape contractor
- D. Maintenance Instructions: Recommended maintenance procedures to be utilized by Owner for maintenance of plants during a complete, full calendar year. Submit before expiration of Contractor's maintenance periods.

1.03 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified contractor whose work of the specific type indicated, has resulted in successful plant establishment and maintenance.
  - 1. Professional Membership: Member in good standing of either the Professional Landcare Network, American Nursery and Landscape Association, or other recognized organization acceptable to Owner.
  - 2. Experience: Three years' experience in plant installation and maintenance.
  - 3. Field Supervision: Required to maintain an experienced full-time supervisor on Project site when work is in progress.
  - 4. Personnel Certifications: Field supervisor assigned to the Work shall have certification in one of the following categories from the Professional Landcare

- Network, or other equivalent, recognized certification process acceptable to owner.
- a. Certified Landscape Technician - Exterior, with maintenance specialty area(s), designated CLT- Exterior.
- b. Certified Turfgrass Professional, designated CTP.
- c. Certified Turfgrass Professional of Cool Season Lawns, designated CTP-CSL.
- 5. Pesticide Applicator: State licensed, commercial.

B. Pre-Work Conference: Conduct conference at Project site

#### 1.04 PROJECT CONDITIONS

- A. Work Restrictions: Coordinate work of this section, including sub-grade preparation and maintenance periods with periods of planting (by others) to provide required maintenance from date of planting completion.
- B. Weather Limitations: Proceed with work, including maintenance procedures only when existing and forecasted weather conditions permit work and maintenance to be performed when beneficial and optimum results may be obtained. Perform maintenance procedures during favorable weather conditions according to plant material source supplier's written instructions.

#### 1.05 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Provide full maintenance by skilled, qualified personnel. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until planting is established, and acceptable to Owner, but for the following period:
  - 1. From date of planting completion until date of acceptance of maintenance responsibilities, as established by Owner.

### PART 2 -PRODUCTS

#### 2.01 PLANTING SOILS, INCLUDING AMENDMENTS

- A. Refer to Division 32 Section "Amending Planting Soils" for requirements related to planting soils and amendments (including fertilizers) for sub-grade planting soils.

#### 2.02 PESTICIDES

- A. General: Pesticides, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by plant growers/supplier for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds.
- C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine sub-grade areas to be prepared (and planted) for compliance with requirements and other conditions affecting performance.
  - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
  - 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
  - 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
  - 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 1. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

3.02 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by Contractor's operations.
  - 1. Protect grade stakes, flags, and other markings set by others until directed to remove them.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent areas.

3.03 PREPARATION

- A. Limit sub-grade preparation to areas to be planted.
- B. Comply with Division 32 Section "Amending Planting Soils" for requirements related to amending (including fertilizing) and otherwise preparing, sub-grade for planting.
  - 1. Reduce elevation of planting soil to allow for soil thickness of sod.
  - 2. Legally dispose of waster material, including grass, vegetation, and turf, off Owner's property.
- C. Moisten prepared area immediately before planting commences if soil is dry. Water thoroughly and allow surface to dry before planting commences. Do not create muddy soil.
- D. Before planting commences, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finishing grading.

3.04 TURF MAINTENANCE

- A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, re-grade, and replant bare or eroded areas and re-mulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
  - 1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
  - 2. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.
  - 3. Subsequent to turf sod grower/supplier's inspection and approval of turf sod conditions, perform (or provide for) mechanical rolling of turf sod when well-rooted, approximately two weeks after installation.
    - a. Perform rolling with "ride-on" type double-drum roller, as recommended by turf sod grower/supplier.
- B. Watering: Where sprinkler/irrigation systems are not operational, install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist, as recommended by turf grower/supplier.
  - 1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
- C. Mow turf as soon as growth is tall enough to cut, as recommended by turf grower/supplier. Do not excessively delay mowing to the extent of being detrimental to growth and health of turf. Do not mow when grass is wet. Schedule Initial and subsequent mowings at intervals as recommended by turf growers/supplier.
- D. Turf postfertilization: Apply fertilizer at intervals, under conditions and rate, as recommended by turf growers/supplier.

### 3.05 SATISFACTORY TURF

- A. Turf installations shall meet the following criteria as determined by Landscape Architect:
  - 1. Healthy, well-rooted, uniform, even appearance, free of weeds, undesirable vegetation, and surface irregularities.
- B. Reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

### 3.06 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work, Notify Owner before each application is performed.
- B. Pre-Emergent Herbicides (Selective and Non-Selective): Apply in accordance with manufacturer's written recommendations.

### 3.07 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by sub-grade preparatory work and continuing maintenance procedures from paved and adjacent areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas. B. Erect

temporary fencing or barricades and warning signs as required to protect planted areas from traffic and damage from other contractor's operations. Maintain fencing and barricades throughout maintenance period and remove when directed or permitted by Landscape Architect.

3.08 RENOVATION

- A. Renovate planting damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.
  - 1. Reestablish planting where settlement or washouts occur or where minor re-grading is required.
  - 2. Install new planting soil as required.
- B. Remove diseased or unsatisfactory areas; do not bury in soil.
- C. Remove topsoil containing foreign materials such as oil drippings, fuel spills, stones, gravel, and other constructions materials resulting from Contractor's operations, and replace with new planting soil.
- D. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, legally dispose of them off Owner's property.
- E. Apply soil amendments and initial fertilizers required for establishing new plantings. Install new planting soil to fill low spots and meet finish grades.

END OF SECTION

## SECTION 03350 – PRECAST CONCRETE RESTROOM BUILDING (PRE-ASSEMBLED)

### PART 1 – GENERAL

#### 1.01 SUMMARY

Contractor to furnish a precast concrete transportable building. Building to be delivered and placed on owner's prepared stone foundation in accordance with manufacturer's recommendations. Precast building to be EASI-SET® brand as manufactured by **StructureCast in Bakersfield, CA.** a licensed manufacturer of Easi-Set Buildings. Building to be provided by manufacturer with all necessary openings as specified by contractor in conformance with manufacturer's structural requirements.

The work of this section consists of prefabrication, on-site delivery, off loading and placement of precast concrete flush toilets at a prepared site.

This section includes specifications for the construction of precast concrete flush buildings. Example of floor plan, interior fixtures and exterior finishes as shown in the attached drawings.

#### 1.02 QUALITY ASSURANCE

- A. ACI-318-02, "Building Code Requirements for Reinforced Concrete". Concrete Reinforcing Institute, "Manual of Standard Practice".
- B. ANSI/ASCE-7-02 "Building Code Requirement for Minimum Design Loads in Buildings and Other Structures".
- C. IBC 2010, 1996 BOCA
- D. Concrete Reinforcing Institute, "Manual of Standard Practice".
- E. UL-752 test method level 5 for bullet resistant walls , certified by an independent structural engineer.

- F. Fabricator must be a certified producer/member of The Precast/Prestressed Concrete Institute (PCI), and /or National Precast Concrete Association (NPCA).
- G. Building fabricator must have a minimum of 5 years experience manufacturing and setting transportable precast concrete buildings.
- H. No alternate building designs to the pre-engineered EASI-SET® building will be allowed unless pre-approved by the owner 10 days prior to the bid date.

### 1.03 DESIGN REQUIREMENTS

- A. Sierra Double Floor Plan Dimensions: 11' x 19' x 9'
- B. Design Loads:
  - 1. Seismic load performance category 'C', Exposure Group III
  - 2. Standard Live Roof Load – 60 PSF
  - 3. Standard Floor Load – 250 PSF
  - 4. Standard Wind Loading – 130 MPH
- C. Out Back Roof Design – Main roof panel shall slope 12 inches from front to back. The front porch roof section shall slope 12 inches. The roof shall extend a minimum of 5" beyond the wall panel on each side. Roof texture shall match simulated wood shake unless specified other by engineer.
- D. Gabled Roof (Option) Carson Wet Model: Roof panel shall slope approximately 12 " from center of building to outside wall on each side. The roof shall extend a minimum of 5" beyond the wall panel all around. Texture to match simulated wood shake roofing unless specified other by engineer.

- E. Roof, floor, and wall panels must each be produced as single component monolithic panels. No roof, floor, or vertical wall joints will be allowed, except at corners. Wall panels shall be set on top of floor panel. **Roof and Floor sections shall be post tensioned as per 2.01-C**
- F. Floor panel must have ½" step-down around the entire perimeter to prevent water migration into the building along the bottom of wall panels.
- G. Plumbing shall be designed in accordance with the 2010 International Plumbing Code.
- H. Electrical system shall be designed in accordance with the 2010 International Electric Code.
- I. Accessibility - Prefabricated flush toilet buildings shall conform to the requirements of the 2010 "Uniform Federal Accessibility Standards" (UFAS) and the "Americans with Disabilities Act Accessibility Guidelines" (ADAAG). Buildings shall have full 60-inch turning diameter in each interior and entry area.

#### 1.04 SUBMITTALS

- A. Engineering calculations that are designed and sealed by a professional engineer, licensed to practice in the state where the project is located, shall be submitted for approval.

### PART 2 – PRODUCTS

#### 2.01 MATERIALS

- A. Concrete: Steel-reinforced, 5000 PSI minimum 28-day compressive strength, air-entrained (ASTM C260). Xypex shall be added to all concrete batches as a water proof additive.
- B. Reinforcing Steel: ASTM A615, grade 60 unless otherwise specified.
- C. Post-tensioning Strand: 41K Polystrand CP50, .50, 270 KSI, 7-wire strand, enclosed within a greased plastic sheath, (ASTM A416). Roof and floor to be each post-tensioned by a single, continuous tendon. Said tendon shall form a substantially rectangular configuration having gently curving corners wherein the positioning of the cable member results in a pattern of one or more loops and a bisecting of the loop(s). The cable member starts from one corner of the concrete building panel, forms a gentle perimeter loop(s) returning to a point where the

cable member entered the concrete building panel. The tendon then turns 90 degrees and follows the cable member(s) to a point midway along the "Y" axis of the concrete building panel and then turns 90 degrees along the "X" axis of the concrete building panel. This bisects the concrete building panel and crosses the opposite parallel portion of the cable member and exits from an adjacent side of the concrete building panel.

- D. Caulking: Joint between building and floor slab shall be caulked on the exterior and interior surface of the joints. Caulking shall be SIKAFLEX-1A elastic sealant or equal. Exterior caulk joint to be 3/8" x 3/8" square so that sides of joint are parallel for correct caulk adhesion. Back of joint to be taped with bond breaking tape to ensure adhesion of caulk to parallel sides of joint and not the back.
- E. Vents: Two screened aluminum vents to be cast in rear wall. Vents shall be SUNVENT #164FL or equal.
- F. Panel Connections: All panels shall be securely fastened together with 3/8" thick steel brackets. Steel is to be of structural quality, hot-rolled carbon complying with ASTM A283, Grade C and hot dipped galvanized after fabrication. All fasteners to be 1/2" diameter bolts complying with ASTM A307 for low-carbon steel bolts. Cast-in anchors used for panel connections to be Dayton-Superior #F-63, or equal. All inserts for corner connections must be secured directly to form before casting panels. No floating-in of connection inserts shall be allowed.

## 2.02 ACCESSORIES

Doors and Frames by **Integrated Entry Systems**. The Integrated Entry System is engineered specifically for StructureCast Precast structures. This specified door, frame and hardware package is designed to provide coordinated components that comply with requirements called out in the specification sections below.

### Doors and Frames:

1. Shall comply with Steel Door Institute "Recommended Specifications for Standard Steel Doors and Frames" (SDI-100) and as herein specified. All door and frame galvanizing shall be in

accordance with ASTM A924 and A653 for hot dipped steel and shall be of the 0.6 oz class of galvanizing.

2. Buildings shall be equipped with 3068 doors: 18 gauge (.045"), 1.75" thick insulated steel. Active doors shall be non-handed, prepared for a cylindrical lever lock, flush top cap and three hinges.
3. Active doors shall be reinforced with minimum, 14 gauge (.072") closer reinforcements to support surface mounted hardware.
4. Doors and frames shall meet SDI standard Level 2 model 1: Heavy Duty 1 ¾" Flush Hollow Metal Doors.
5. Frames shall comply with ANSI 250.8-2003 (SDI-100) and be constructed of 16 gauge hot dipped galvanized (.053") steel in a depth to match the wall thickness. Frames shall be knocked down, mechanically fastened, or welded, cast in place or post anchored as required. Strike jambs shall be prepared to receive three rubber mutes to cushion door closing.
6. Doors and frames shall be reinforced to receive surface applied hardware. Minimum 7 gauge hinge reinforcements shall be used to prevent door sag.
7. Doors and frames shall be factory treated with an anticorrosive phosphate solution to inhibit rusting and to etch metal to accept top coating of field applied finishes. Doors and frames shall be given one coat of rust inhibitive primer and one finish coat of enamel paint.
8. Doors, frames and hardware shall comply with the requirements under 2010 ADA Standards for Accessible Design.

Door Hardware: Limited Lifetime Warranty on Mechanical assemblies as noted

1. Hinges: Self Closing Hinges: Hinge standards shall comply with ANSI 156.17 Grade 1 self closing hinges (3 per door minimum) Hinges shall meet NFPA 80 label requirements for 3 hour fire doors. Hinges shall be 32D (Type 630) Satin Stainless Steel. Manufacturer shall provide a Limited Lifetime Warranty on this product. Approved manufacturers: Design Hardware, Hager, or equal.

2. Cylindrical Lock: Commercial Grade, ANSI 156.2, Series 4000, UL listed ADA approved. Dormitory function. Deadlocking latch bolt x levers except when locked by push button in inside lever. Key in outside lever locks or unlocks outside lever and releases button. Closing door releases push button. Inside lever always free. Zinc dichromate chassis with cast solid zinc levers to resist corrosion. Furnish locks with 6 pin solid brass standard Schlage "C" keyway. All locks to be keyed alike. Manufacturer shall provide a Limited Lifetime Warranty on this product. Approved manufacturers: Design Hardware, Hager, or equal
3. Drip Cap: Aluminum drip cap with minimum projection of 2 ½" shall be furnished. Drip cap to extend 2" beyond each end of opening to allow for appropriate protection against the elements. Approved manufacturers: National Guard Products, Design Hardware or equal
4. Door Stop: ANSI 156.16 Approved wall mounted door stop with keeper constructed of a corrosion resistant cast brass material. Finish 26D (Type: 626) Brushed Chrome Finish. Approved manufacturers: Don Jo, ABH or equal.
5. Door Sweep: Nylon brush door sweep, with drip edge. ANSI/BHMA certified. Sweeps shall be approved for UL 10C Positive Pressure and suitable for use with fire doors rated up to three hours. Approved manufacturers: National Guard Products or equal.

## 2.03 FINISHES

- A. Interior of Building: Smooth steel form finish on walls and ceiling surfaces. Floor shall have a light broom non slip finish.
- B. Exterior of Building: Architectural precast concrete finish must be imprinted in top face of panel while in form. Texture shall be vertical Barn Board from Dayton Superior.
- C. Other textures are available if specified by the engineer. Easi-Brick, Split Face Block, Acid etch, Horizontal wood siding, Ashlar Stone, Exposed Aggregate with integral color.
- D. Inside and out shall be stained with Sherwin Williams, H&C Concrete Stain. Interior color shall be white with a grey floor. Exterior shall be as specified by the engineer. Exterior to have anti-graffiti coating. Stain shall be applied per manufacturer's recommendation.

- E. One 12" x 36" Tapered - Pebble Texture - Lexan window installed with a steel frame per short side of the building. Metal shall be primed and painted with anti - corrosive paint.

## PART 3 – EXECUTION

### 3.01 SITE PREPARATION REQUIREMENTS (**MANUFACTURER'S RECOMMENDATION**)

- A. EASI-SET® building shall bear fully on a crushed stone base that is at least two feet larger than the length and width of building.
- B. Stone shall be a minimum of 4" thick or down to firm subgrade. The vertical soil capacity under stone shall be compacted to have minimum bearing of 1,500 pounds per square foot. Stone shall be 3/8" or smaller and must be screeded level within 1/4" in both directions. Stone shall be placed within a perimeter form with flat and level top edge for screeding. Forming material shall remain around stone until after the building is set.
- C. The crushed stone base shall be kept within the confines of the soil or perimeter form. Do not allow the stone base to become unconfined so that it may wash, erode, or otherwise be undermined.

*OR*

If building is placed on pavement or concrete slab, substrate below pavement or slab must have a vertical soil capacity of 1,500 pounds per square foot. Place stone or sand to 1" above highest point of area where building will be placed and at least 1'-0" wide all around the building footprint. Retain stone or sand with a perimeter form to prevent the material from washing out.

- D. Provide positive drainage for the fill, concrete pad, or slab as required.

### 3.02 ACCESS

Contractor must provide a level unobstructed area large enough for a crane and a tractor-trailer to park adjacent to the pad. Crane must be able to place outriggers within 5'-0" of edge of pad and truck and crane must be able to get side by side under their own power. No overhead lines may be within 75' radius of center of pad. Firm roadbed with turns that allow 65' lowbed tractor-trailer must be provided directly to site. A minimum of 24" clearance is required between this building and adjacent buildings.

#### PART 4 - PLUMBING

- A. Waste and vent piping: ABS or PVC plastic.
- B. Water piping: ½ " Copper tubing Type L, hard drawn. Provide a gate or ball valve at the inlet end of the water line.
- C. Provide a main shut-off valve and drain in the service area.
- D. Toilet (water closet) and seat and urinal (if provided): Type 304 stainless steel, wall hung, with siphon jet action. Provide back spud for concealed flush valve connection. Murdock Super Secure Model 1001F/1002F
- E. Flush valve: Murdock Super Secure concealed closet flush valve. Model 1150 Series
- F. Lavatory: Type 304 stainless steel, 18 inches wide x 18 inches front to back x 4 inches deep. Murdock Super Secure Model # 1011
- G. Faucet: Self-closing water set with indexed push button.
- H. Hose bib: Provide single unit in the service area.
- I. Floor drains: Provide a floor drain in each room of the toilet building where there are two or more toilet fixtures per room.
- J. ADA Railing - Stainless steel tubing, 1-1/2 inch outside diameter mounted 1-1/2 inches from wall, 18 gauge, type 304 Stainless steel concealed screw-mounting flanges, 48 inches long by All Partitions, Murdock, or approved equal.

- K. Bar-type toilet paper dispenser shall be constructed of extra heavy gauge stainless steel with satin finish, designed to hold two standard rolls of toilet paper. Holder shall not prevent the free turning of the paper rolls. The dispenser shall be Murdock Super Secure part # 1113-PL and come with a padlock.
- L. Mirrors shall be a frameless Stainless Steel Mirror # 8026-1624 by American Specialties
- M. ADA signage at each restroom door.
- N. Outside Drinking Fountain: Install one outside dual ADA drinking fountain per plan drawing with ADA Barrier bars. ELKAY Model EHWM17C.

#### PART 5 - Electrical

- A. Provide a 100-amp breaker panel in the service area.
- B. Wire: Copper.
- C. Light fixtures:
  - 1. Service area: 1- 4 foot ceiling mounted fluorescent, switch and motion detector controlled.
  - 2. Toilet rooms: 1 - 4 foot vandal resistant ceiling mounted fluorescent with motion detector activation.
  - 3. Outdoor: 35-watt high-pressure sodium, cast aluminum case, rated for outdoor use, photocell activated. One for the front and rear of the unit.
  - 4. Hand dryer: Air compression type with automatic activation. Xlerator Model XL-BW Power input 120VAC
  - 5. One GFI receptacle in each room of the building.

## INSTALLATION OF PRECAST CONCRETE TOILET AND UTILITY BUILDINGS

### PART 1 – GENERAL

#### A. Description

1. The work of this section consists of installing precast concrete toilet and utility buildings including clearing and grubbing, excavating, backfilling, site grading and cleanup.

#### B. Quality Assurance

1. Ensure that water on the floor slab drains towards the door where no floor drains are provided.

#### C. Flush Toilet

1. All plumbing and electrical connections shall be made by licensed plumbers and electricians in the state where the building is installed.

#### D. Toilet Building Accessibility

2. Ensure that paths within 50 feet of the toilet building are accessible and meet ADA requirements. By General Contractor.

#### E. Submittals

1. Certification from supplier that bedding material meets the gradation specified.
2. If blasting is required for excavation, submit blasting plan.
3. Building installation manual.

F. Delivery and Handling

1. Contractor shall coordinate with the building manufacturer for the delivery and placement of the precast concrete building. Refer to Sections 13120, 13121 or 13122.
2. The Ordering Unit Contracting Officer shall provide detailed directions and a map for each delivery site.
3. Roads and bridges shall be rated for highway loads along the access route. The Ordering Unit Contracting Officer shall verify that the delivery site is accessible by trucks (18-wheeler) with a 48 ft. trailer. If the delivery site is inaccessible the Contractor shall coordinate with the Ordering Unit Contracting Officer for delivery. The Government will pay additional costs.
4. Building shall be installed according to the manufacturer's installation instructions.

PART 2 – PRODUCTS

A. Soil Classification

1. Excavation shall be unclassified as to materials and shall include all materials that are encountered in the required excavation.

B. Backfill Material

1. Backfill material shall be sandy clay, sand, gravel, soft shale, or other suitable material free from brush, organic material, dirt clods, stone or boulders larger than six inches in greatest dimension or frozen material.
2. Backfill within six inches of concrete shall contain no stone larger than two inches and no stone two inches or larger shall lie closer than six inches to the ground surface.
3. Backfill material shall be excavated material whenever it meets specification requirements. Whenever excavated material contains less than 10 percent of oversized material, the Contractor shall remove boulders larger than 6" from the excavated material at no additional compensation and utilize it as backfill material. Whenever material meeting the specification requirements is not available from excavation, the Contractor shall import material from a designated or approved source.

C. Select borrow

1. When excavated soil does not meet the requirements for backfill, Contractor shall backfill with select borrow obtained from a source identified by the Ordering Unit Contracting Officer.

D. Bedding material

1. Bedding material shall be washed sand or 3/8" minus crushed or screened aggregate from a private or commercial source. Sand or aggregate shall be used as a leveling course beneath the concrete vault or slab.

E. Accessible path surfacing

1. The Government will provide granular surface material for placement by the Contractor within 50 feet of the building.

F. Sealant

1. For vault toilet buildings, use 100% silicone caulk, clear for vent pipe and toilet riser. GE Silicone II, 800-626-2000, or approved equal.

### PART 3 - EXECUTION

#### A. Staking

1. The Contractor will establish the finish floor elevation and approximate corners of the building prior to the Contractor beginning work.

#### B. Clearing and Grubbing

1. Clearing and grubbing shall be confined to designated areas and only marked trees may be removed. Maximum clearing and grubbing shall be confined to an area 20 feet beyond the back and sides of the building and 30 feet in front of the building. Construction work shall disturb a minimum of the existing terrain and plant life adjacent to the cleared and grubbed area. The Contractor shall exercise care to not damage unmarked trees and shrubbery. Skinned or barked trees shall be repaired with an application of black asphalt emulsion especially formulated for such use.
2. Trees shall be felled within the clearing limits, usually towards the center, so as to prevent damage to the trees that are to be left standing. When necessary to prevent damage to structures, adjacent trees, property, or to minimize danger to traffic, trees shall be cut in sections from the top downward.
3. All trimming of trees shall be done in accordance with approved horticultural practices. Branches shall be saw cut flush with the trunk. Stumps within the clearing limit but out of the excavation area shall be cut not more than 6 inches above the ground.
4. Trees and limbs larger than 4 inches in diameter shall be cut in 8-foot lengths and stockpiled as directed by the Ordering Unit Contracting Officer.

#### C. Topsoil

1. Topsoil shall be removed from the area to be excavated and from the area where excavated material shall be piled prior to excavating. Topsoil shall be kept separate from excavated material. Topsoil shall be reused on those areas from which it came after backfilling is complete.

D. Safety, Shoring, and Protection

1. The Contractor shall meet OSHA safety rules and regulations. Walls of excavations 4' or more in depth shall be supported by bracing, shoring, or other methods, unless the walls are sloped to a safe angle from the bottom. If shored, the excavation shall be of proper dimensions to accommodate shoring and bracing, as required to keep walls from collapsing and to allow for proper installation of the work. All existing improvements, either on public or private property, shall be fully protected from damage. All supports shall be removed after construction is completed, and shall be withdrawn in a manner that will prevent the collapse of the sides of the excavation. All openings in the ground, caused by the removal of supports, shall be filled with suitable material properly compacted.
2. All excavations left open overnight shall be fenced with wire or plastic mesh secured to steel posts all around the excavation.
3. The bottom of the fence shall follow the contour of the ground
4. Maximum spacing of the steel posts shall be 10 feet.
5. Minimum height of the fence shall be 36 inches.

E. Removal of Water

1. The Contractor shall provide and maintain, at all times during construction, ample means and devices with which to promptly remove and properly dispose of all water entering the excavations or other parts of the work without damage to adjacent property. All excavations shall be kept free from standing water. The Contractor at his own expense shall repair any damage caused by water in the excavation.

F. Excavation, backfill, and site grading

1. Coordination with the Building Manufacturer Contractor shall coordinate with the manufacturer of the precast concrete building to accommodate installation at the time of delivery. The Contractor shall be responsible to obtain installation instructions from the manufacturer and perform the excavation, backfill, and site grading in accordance with those instructions. The excavation shall be over excavated two feet (horizontal measurement) on each side of the vault or slab to allow for compaction and minor adjustments in orientation. The Contractor must have excavation complete prior to delivery of the precast concrete building. The Contractor will be provided 1-week minimum lead-time to have the excavation work performed. Also, the Contractor must be on site at the time of delivery to perform the backfill operation as soon as the precast concrete building is in place.

G. Excavation

1. Excavation shall be performed by any method approved by the Ordering Unit Contracting Officer. Stockpile excavated material away from the excavation to facilitate crane and delivery truck access. The crane and delivery truck typically need to be side-to-side during placement.
2. Compact the natural ground at the bottom of the vault excavation with a minimum of three passes with an approved whacker-type mechanical tamper.

H. Bedding

1. The Contractor shall place a leveling course prior to placement of the vault or building.
2. Compact leveling course with one pass of an approved whacker-type mechanical tamper.
3. Grade leveling course so there will be no high spots in the middle.

4. Compact with a second pass with a tamper. Slope the top of the bedding one percent from back to front of building.
5. Minimum compacted leveling course for vault shall be 4 inches.
6. Minimum compacted leveling course for building slab shall be 6 inches.

#### Building Placement

Refer to Section 13120, 13121 or 13122.

#### I. Backfill

1. Backfill shall be permitted only after the work to be covered has been approved by the Ordering Unit Contracting Officer. Backfill shall be placed in 8" thick (loose measurement) lifts and compacted with three complete passes of an approved vibratory compactor.

#### J. Start-up procedures

##### 1. Vault Toilet

- a. Vault Preparation - Add approximately 80 gallons of potable water to cover the floor of the vault(s).

##### 2. Vent Pipe Installation

- a. Install vent pipe plumb and seal around pipe at top and underside of roof with silicone sealant.
- b. Seal around pipe at top of slab with silicone sealant.

##### 3. Toilet Riser Installation

- a. Apply silicone sealant between toilet riser flange and concrete floor before the riser is installed.

2. Flush Toilet

- a. Plumbing Connection - Make connections to water and sewer lines in accordance with manufacturer's instructions.
- b. Electrical Connection - Make connection to electrical service in accordance with manufacturer's instructions.

K. Finish grading

1. All surfaces and slopes shall be shaped to blend with the original ground line, mounded over or smoothed off, and raked, and left in a uniform and neat condition. Stockpiled topsoil shall be smoothly distributed over disturbed areas and hand raked to blend with ground line. Final grade shall be flush with top of front slab to provide accessibility. Surface drainage shall be diverted so that it will not enter into the area.
2. The surface of accessible paths within 50 feet of the building shall be compacted with 3 passes of a vibratory compactor prior to placement of Government furnished granular material. Place granular surface material and compact with 3 passes of a vibratory compactor, wetting the material between passes.

L. Cleanup

1. After backfilling and grading has been completed, the disturbed area shall be finished to present as near a natural appearance as possible and cleaned up by removing all debris and materials not utilized.

M. Disposal

1. All unsuitable excavated material, oversize boulders, stumps, small limbs, brush, sod and other construction refuse shall be disposed of off-site at a State-approved disposal site.

END OF SECTION

SECTION 04220 – CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Division 01 Specification Sections, Drawings, General Conditions, Supplementary General Conditions, and Special Conditions apply to this section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Concrete masonry units (CMUs).
  - 2. Mortar and grout.
  - 3. Reinforcing steel.
  - 4. Control joint materials.
  - 5. Masonry joint reinforcement.
  - 6. Ties and anchors.
  - 7. Embedded flashing.
  - 8. Miscellaneous masonry accessories.
- B. Products installed, but not furnished, under this Section:
  - 1. Section 055000 Metal Fabrication for steel lintels and shelf angles for unit masonry.
  - 2. Section 076200 Sheet Metal Flashing and Trim.
- C. Related Sections:
  - 1. Section 042200.13 Concrete Unit Veneer Masonry
  - 2. Section 042223.23 Prefaced Concrete Unit Masonry for Astra-Glaze-SW glazed masonry units.
  - 3. Section 042300 Glass Unit Masonry for glass block.
  - 4. Section 042713 Composite Unit Masonry.
  - 5. Section 047200 Cast Stone Masonry.
  - 6. Section 071900 Water Repellents for water repellents applied to unit masonry assemblies.
  - 7. Section 076200 Sheet Metal Flashing and Trim for exposed sheet metal flashing.
  - 8. Section 078413 Penetration Firestopping for firestopping at openings in masonry walls.
  - 9. Section 078443 Fire-Resistive Joint Sealants for fire-resistive joint systems at heads of masonry walls.
  - 10. Section 079200 Joint Sealants for sealing control and expansion joints in unit masonry.
  - 11. Section 321413 Precast Unit Paving for interlocking concrete pavements.
  - 12. Section 323223 Segmental Retaining Walls for dry-laid, concrete unit retaining walls.

1.3 SUBMITTALS

- A. Certificates of compliance with respective ASTM standards shall be submitted on all products specified herein.
  - 1. Concrete masonry units.

2. Spec Mix preblended mortar: Include test report or batch data for verification of proportions of materials.
  3. Grout: Include mix design for verification of proportions of materials.
  4. Steel reinforcing bars.
  5. Preformed control joint gaskets.
- B. Samples for Verification: For each type and color of the following:
1. Exposed concrete masonry units.
  2. Mortar, for color selection or confirmation.

#### 1.4 QUALITY ASSURANCE

- A. Preconstruction Testing.
1. Owner will select a qualified independent testing agency to perform preconstruction testing indicated below. Payment for these services will be made by Owner.
  2. The compressive strength of masonry shall be determined based on strength of the unit and type of mortar specified (Unit Strength Method) per IBC Table 2105.2.2.1.2 (ACI 530.1/ASCE 6/TMS 602 Table 2).
    - a. Concrete Masonry Units: Test per ASTM C 140.
    - b. Grout: Test per ASTM C 1019.
  3. The compressive strength of masonry shall be determined by the prism test method in accordance with ASTM C 1314. Schedule masonry procurement sufficiently in advance to allow for prism construction and curing.
    - a. Prism Test: For each type of construction required, construct and test threeprisms per ASTM C 1314.
  4. Mortar and grout tests: At beginning of work, sample mortar and grout on three successive working days per CBC Section 2105A.5.
- B. Fire-Resistance Ratings: Where required, provide materials and construction with fire-resistance ratings determined by equivalent concrete masonry thickness in accordance with IBC Table 720.1(2) Material 3. Concrete Masonry Units.
- C. Sample Panels: Construct an approximate long by panel for representation of completed masonry, joint tooling, design details, and workmanship. Comply with requirements in Division 01 Section "Quality Requirements" for mockups.
1. The following shall be installed in the sample panel:
    - a.
    - b.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination",

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. All materials of this section shall be protected to maintain quality and physical requirements.
- B. All masonry units shall be stored on the jobsite so that they are protected from rain, stored off-ground and kept clean from contamination. Prevent units from being otherwise wetted.

- C. Store Spec Mix preblended mortar mix in manufacturer's original, unopened, undamaged containers with identification labels intact, covered and protected from weather, or in a Spec Mix dispensing silo.

## 1.6 FIELD CONDITIONS

- A. Securely cover tops of all unsheltered walls and partially completed walls when work is not in progress.
- B. Cold-weather procedures when ambient temperature falls below 40°F (4°C) or the temperature of masonry units is below 40°F (4°C):
  - 1. Wet or frozen units shall not be laid.
  - 2. Implement cold weather construction procedures in accordance with IBC Section 2104.3.
- C. Hot-weather procedures when ambient temperature exceeds 100°F (38°C), or exceeds 90°F (32°C) with a wind velocity greater than 8 mph:
  - 1. Implement hot weather construction procedures in accordance with IBC Section 2104.4.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURER

- A. Concrete masonry units.
  - 1. Angelus Block Co., Inc.
    - a. Sun Valley, CA (818) 767-8576
    - b. Orange, CA (714) 637-8594
    - c. Fontana, CA (909) 350-0244
    - d. Gardena, CA (310) 323-8841
    - e. Oxnard, CA (805) 485-1137
    - f. Indio, CA (760) 347-3245
- B. Preblended mortar.
  - 1. Spec Mix Preblended Mortar Mix, by E-Z Mix, Inc.

### 2.2 MASONRY PERFORMANCE REQUIREMENTS

- A. Provide materials to achieve the net compressive strength of concrete unit masonry equal to or greater than 1500 psi  $f'_m$ .
- B. Provide materials to achieve the net compressive strength of concrete unit masonry equal to or greater than the  $f'_m$  as indicated .

### 2.3 CONCRETE MASONRY UNITS

- A. Concrete Masonry Units: ASTM C 90.
  - 1. Weight Classification: Mediumweight unless otherwise indicated.
  - 2. Color(s) and texture(s):

a.

## 2.4 MORTAR AND GROUT MATERIALS

- A. Spec Mix Masonry Mortar preblended factory mix: ASTM C 270, proportions.
  - 1. Portland cement: ASTM C 150
  - 2. Hydrated lime: ASTM C 207
  - 3. Aggregate for mortar: ASTM C 144.
- B. Grout:
  - 1. Portland cement: ASTM C 150
  - 2. Aggregate: ASTM C 404.
  - 3. Fly ash: ASTM C 618.
- C. Water: Potable.
- D. Admixtures:
  - 1. The use of admixtures shall not be permitted except as specified herein, or as approved by the Architect or Engineer of Record and the Building Official.
  - 2. PRE-MIX Products Grout Additive manufactured by E-Z Mix, Inc. Use per manufacturer's specifications.

## 2.5 REINFORCEMENT

- A. Steel Reinforcing Bars: ASTM A 615, Grade 60.
- B. Masonry Joint Reinforcement: ASTM A 951.
  - 1. Masonry joint reinforcement used in exterior walls shall be hot-dipped galvanized.

## 2.6 TIES AND ANCHORS

- A. Metal ties and anchors shall meet the requirements of IBC Section 2103.13.

## 2.7 FLASHING MATERIALS

- A. Provide metal flashing in accordance with Section 076200 Sheet Metal Flashing and Trim.

## 2.8 MISCELLANEOUS MASONRY ACCESSORIES

- A. PVC Preformed Control-Joint Gaskets: per ASTM D 2287, Type PVC.
- B. Rubber Preformed Control-Joint Gaskets: per ASTM D 2000, Designation M2AA-805.

## 2.9 MORTAR AND GROUT MIXES

- A. Type S Spec Mix Preblended, Dry Mortar Mix.

1. Complies with ASTM C 270 Proportion Specification.
  2. Natural gray color.
- B. Grout for Unit Masonry: per ASTM C 476.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Prior to the start of masonry installation, verify all conditions pertinent to the performance of work in this Section are acceptable.
1. Foundation shall be level and at correct grade such that the initial bed joint shall not be less than 1/4 inch nor more than 3/4 inch.
  2. Verify that reinforcing dowels are properly placed.
- B. Masonry work shall not proceed until unsatisfactory conditions have been corrected or cleared by the governing authority.

#### 3.2 INSTALLATION

- A. Cut units as required to fit; use motor-driven masonry saw. Install cut units with cut surfaces edges concealed as much as possible.
- B. Lay dry units only, unless otherwise approved.
- C. Select and arrange units for exposed masonry to produce a uniform blend of colors and textures.
1. Mix units from several pallets or cubes as they are placed.
- D. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602.

#### 3.3 LAYING MASONRY WALLS

- A. All masonry shall be laid true, level, plumb, and in accordance with the drawings.
- B. Masonry shall be laid in running bond unless otherwise indicated.
- C. Exposed masonry shall be laid in unless otherwise indicated.
- D. Concealed masonry with shall be laid in running bond unless otherwise indicated.
- E. Install built-in items specified in this and other Sections as work progresses. Solid grout all spaces around built-in items unless otherwise noted on the drawings.

#### 3.4 MORTAR BEDDING AND JOINTING

- A. Lay hollow units with head and bed joints filled with mortar for the thickness of the face shell..

- B. Lay solid units with full head and bed joints. Do not fill head joints by slushing with mortar. Bed joints shall not be furrowed deep enough to produce voids.
- C. All mortar joints on exposed walls shall be concave, unless otherwise indicated, and struck to produce a dense, slightly concave surface well bonded to the surface of the masonry unit.
- D. Cut joints flush for masonry walls to receive plaster, unless otherwise indicated.
- E. Thickness of bed joints shall not exceed 5/8 inch.

### 3.5 MASONRY JOINT REINFORCEMENT

- A. Embed joint reinforcement with minimum 5/8 inch cover to exposed face, and 1/2 inch elsewhere.

### 3.6 CONTROL AND EXPANSION JOINTS

- A. Construct control joints as detailed in the drawings as masonry progresses.
  - 1. Install preformed control-joint gaskets designed to fit standard sash block.

### 3.7 INSTALLATION OF REINFORCING STEEL

- A. Place reinforcement as detailed on the drawings.
  - 1. Maintain clear distances between reinforcement and masonry, and maintain placement tolerances in compliance with requirements in ACI 530.1/ASCE 6/TMS 602.

### 3.8 GROUTING

- A. Comply with grout placement requirements in ACI 530.1/ASCE 6/TMS 602.

### 3.9 FIELD QUALITY CONTROL

- A. Inspection tasks and frequency shall be performed in accordance with the Statement of Special Inspections.
- B. Unless indicated otherwise, perform one set of tests for each 5000 sq. ft. of wall area or portion thereof.
- C. Concrete Masonry Units: test per ASTM C 140.
- D. Grout: Test per ASTM C 1019.
- E. Prism Test: For each type of construction indicated, construct and test three prisms per ASTM C 1314 at 28 days.
- F. Masonry Core Test: Core and test per CBC Section 2105A.4 from locations selected by the Design Professional.

- G. Mortar and grout tests: Sample mortar and grout at minimum one-week intervals per CBC Section 2105A.5.

### 3.10 POINTING, AND CLEANING

- A. Point and tool holes in mortar joints to produce a uniform, tight joint.
- B. During construction, minimize any mortar or grout stains on the wall. Immediately remove any staining or soiling that occurs.
  - 1. For precision or textured units, except as noted below, clean masonry by dry brushing before tooling joints.
  - 2. For burnished concrete masonry units, immediately remove any green mortar smears or soiling with a damp sponge
- C. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  - 1. Clean exposed cmu walls with a light sandblast. All nonmasonry work near the area to be sandblasted shall be covered or protected before the sandblasting starts. Care shall be taken to avoid contamination to areas that are not to be sandblasted.
    - a. Glazed, burnished, or pre-finished masonry units, shall be protected from sandblast operations.
- D. At completion of masonry work, remove all scaffolding and equipment used during construction, and remove all debris, refuse, and surplus masonry material from the site.

### 3.11 JOBSITE SANDBLASTING

- A. Sandblast for textural effects as indicated on the drawings.
- B. Apply sandblasting to precision masonry walls at indicated areas, as demonstrated on approved samples, in uniform and consistent texture.

### 3.12 WATER REPELLENT APPLICATION

- A. Cleaning shall be complete and accepted by the Architect, and wall surfaces shall be thoroughly dry.
- B. Apply water repellent in strict accordance with Section 071900 and the water repellent manufacturer's instructions.

END OF SECTION 042200

## SECTION 05500

### METAL FABRICATIONS

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Section includes requirements for provision of Metal fabrications not necessarily limited to the following:
  - 1. Railing assemblies: guardrails, handrails, handrail brackets and intermediary rails.
  - 2. Custom fabricated ferrous metal items 16 gage and heavier.
  - 3. Pipe sleeves, metal connectors, embeds, bolts, plates, and hangers.

##### 1.2 SUBMITTALS

- A. Provide shop drawings for all hand railings and structures.

#### PART 2 – PRODUCTS

2.1 GENERAL: Provide and install items complete in respect to function as intended.

##### 2.2 MATERIALS

- A. Structural Steel Shapes Plates Bars And Rods: ASTM A36.
  - 1. Steel Plates
    - a. Low and Intermediate Tensile Strength: ASTM A283.
    - b. Normalized High-Strength Low-Allow Structural Steel: ASTM A633.
    - c. Steel Sheets and Strip: ASTM A569 and A570.
  - 2. Steel Sheet
    - a. Commercial Quality: ASTM A366.
    - b. Structural Quality: ASTM A611.
- B. Structural Tube Steel: ASTM A500 and A501. C.  
Structural Steel Pipe: ASTM A53, Grade B.
- D. Bolts, Nuts and Washers: A307 or A36. E.  
Other Metals: Specialty items.
- F. Welding Materials: Applicable AWS D1.1, type required for materials being welded. Use E70 welding electrodes for all structural steel welding.

## 2.3 PAINTING

- A. Shop Prime
  - 1. Coatings For Protection of Dissimilar Materials: Bituminous type paint.
  - 2. Primer For Ferrous Metal: Modified alkyd rust inhibitive primer. Tnemec Co Inc.'s "Series 10, P10-99 Red color.

## 2.4 STANDARD CATALOG PRODUCTS

- A. Non-Shrink Grout
  - 1. Combination of metallic aggregates and Portland cement preformulated for job site mixing.
  - 2. Manufacturer: Sullivan Co., "Sulco"; Conrad B. Sovig Co., "Consov Iron Waterproofing"; Master Builders, "Embeco"; Grace Construction Materials, "Vibro-Foil"; or equal.

## 2.5 FABRICATION

- A. Shop Fabrication and Finish Schedule:
  - 1. Painting
    - a. General
      - 1) Apply prime paint materials in accordance with manufacturer's instructions and recommendations.
      - 2) Permit thorough drying before shipment.
      - 3) Spot paint abrasions and field connections after assembly.
    - b. Galvanizing Repair Paint: Apply paint having minimum dry film thickness of 2 mils.
    - c. Prime Paint: Apply paint having minimum dry film thickness of 1.5 mils minimum.
    - d. Bituminous Coating for Protection of Dissimilar Materials: Apply at least two coats, minimum 5 mils total thickness.
    - e. Finish Painting: As specified in Section 09900.
  - 2. Galvanizing
    - a. Hot-dip galvanize products after fabrication in accordance with the following, as applicable:
      - 1) ASTM A123.
      - 2) ASTM A153.
      - 3) ASTM A385.
    - b. Mark galvanized products with the name of the galvanizer, the applicable ASTM designation, and the weight of the zinc coating.
    - c. Galvanize fabricated items complete, or in the largest practicable sections.
    - d. Galvanizing shall be at the rate of 2.0 ounces per square foot, minimum.
    - e. Galvanized items that are to be painted shall be wash-primed within six hours of galvanizing.
    - f. Touch-up galvanized items with zinc-rich paint as required by the University's Representative..
  - 3. Finish Schedule.
    - a. Ferrous Metal Interior Items

- 1) Concealed: Clean, chemically etch and shop-apply one prime coat.
- 2) Exposed: Clean, treat with hot phosphate, chemically etch, and shop apply one prime-coat.
- b. Ferrous Metal, Exterior Items
  - 1) Concealed: Clean and hot-dip galvanize in accordance with galvanizing standards.
  - 2) Exposed
    - a) Typical: Clean, then hot-dip galvanize in accordance with galvanizing standards, chemically etch and shop- apply one prime-coat.
    - b) Intermediary rails to be welded as noted.
    - c) Hardware Including Fasteners (Bolts, Nuts, Washers and Similar Type Items): Finish to match item fastened.

## 2.6 SOURCE QUALITY CONTROL

- A. Inspections: The Owner's Testing Agency will continuously inspect welding in field of fabricated items in accordance with applicable requirements of CBSC CBC Chapter 17A.

## PART 3 – EXECUTION

### 3.1 FIELD QUALITY CONTROL

- A. Inspections: The Owner's Testing Agency will continuously inspect welding in field of fabricated items in accordance with applicable requirements of CBSC CBC Chapter 17A.

END OF SECTION

SECTION  
05560

MISC. METAL WORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Light structural steel framing members and structural steel support members, with required bracing, welding and fasteners.
- B. Steel and aluminum, materials for miscellaneous metal fabrications specified in this Section and required but not specified in other Sections.
- C. Anchors and fasteners for connection to concrete and steel construction.
- D. Shrinkage-resistant grout and grouting of structural framing baseplates, equipment anchors and miscellaneous metal fabrications.
- E. Light structural steel framing members and structural steel support members, with required bracing, welding and fasteners.
  - Ornamental railings and handrails, fabricated from steel stock.
  - Misc. metal fabrication for signage assembly.
- F. Galvanizing of steel products.
- G. Shop priming and painting of steel fabrications.

1.2 RELATED SECTIONS

- A. Section 03200 - Reinforcing Steel: Placement of embedded products.
- B. Section 03300 - Cast in Place Concrete: Materials and methods for grouting of structural members.
- C. Section 05400 – Cold-formed Structural Metal Framing.
- D. Section 05500 – Metal Fabrications.
- E. Section 09900 – Painting: Field priming: field-applied finish or interior metal fabrications.
- F. Division 16 – Electrical: Electrical supporting devices: component and equipment anchorage and attachment.

1.3 REFERENCES

- A. Aluminum Association (AA):
  - AA - Standards for Architectural Aluminum.
  - AA - Designation System for Aluminum Finishes.
- B. American Hot Dip Galvanizers Association (AHDGA): Recommended Details for Galvanized Structures.

- C. American Institute of Steel Construction (AISC):  
AISC Manual of Steel Construction.  
AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.
- D. American Welding Society (AWS):  
AWS D1.1 - Structural Welding Code—Steel.  
AWS D1.2 - Structural Welding Code—Aluminum.  
AWS D1.3 - Structural Welding Code—Sheet Steel.
- E. National Association of Architectural Metals Manufacturers (NAAMM): Metal Finishes Manual.
- F. Steel Structures Painting Council (SSPC): SSPC Painting Manual, Volumes 1 and 2.

#### 1.4 SUBMITTALS

- A. Product Data: Submit catalog data for all standard production products. B.  
Shop Drawings:  
Indicate fabrication and installation of metal fabrications, per Section 01300.  
Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.  
Include erection drawings, elevations, and details where applicable.  
Indicate welded connections using standard AWS welding symbols. Indicate net weld lengths.  
For products indicated to comply with certain design loadings, include structural analysis data sealed and signed by a Professional Structural Engineer currently registered to practice in the State of California, who was responsible for their preparation
- C. Product Data: Submit catalog data for all standard production products.

#### 1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Conform to Uniform Building Code (UBC).
- B. Fabricator's Qualifications: Fabricator of light structural steel framing members and other miscellaneous metal fabrications of structural character shall be approved by the Building Official in accordance with applicable Code provisions.
- C. Welder's Qualifications: Welding shall be performed by certified welders qualified in accordance with procedures specified in the appropriate referenced AWS standard, using materials, procedures and equipment of the type required for the Work. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone re-certification.
- D. Coordination: Provide templates and sleeves for incorporation of embedded items into the work specified elsewhere herein.
- E. Field-Verified Dimensions: Prior to fabrication, field verify dimensions and details of construction. Immediately report variances in writing to Architect. Do not proceed with the work until clarification has been received from the Architect.

## 1.6 QUALITY ASSURANCE

- A. Storage, General: Store products in enclosed, well-ventilated spaces, not in contact with soil or vegetation and not subject to inclement weather.
- B. Delivery, Storage and Handling, Galvanized Products:
  - Stack and bundle during transport and store to allow air flow between galvanized surfaces
  - Load for transport to permit continuous drainage should wetting occur.
  - Do not rest galvanized products on cinders or clinkers.
- C. Bundles shall be intact and identified with appropriate and legible labels or tags.

## 1.7 PROJECT CONDITIONS

- A. Field Inspection of Fabricated Products: Prior to installation, inspect products for damage and verify markings and dimensions against reviewed submittals.
- B. Environmental Conditions: Do not install products intended for interior locations when spaces are uncovered and unprotected from inclement weather.
- C. Coordination: Coordinate metal fabrications Work with Work specified in other Sections so that related Work shall be accurately and properly joined.

## PART 2 - PRODUCTS

### 2.1 HANDRAILS

- A. Coordinate with all necessary trades doing adjoining or essential work to assure proper fit and installation for the safety of the users.

#### Handrails:

Shall be provided by this section, including installation.

Shall be provided by Division 5, including installation.

- B. Shop and as-built drawings for approval, coordination and record shall be included as part of the system requirements.
- C. All applicable trade standards shall be followed, including basic engineering standards, welding standards and steel construction standards.

### 2.2 PRODUCTS:

- A. Hand Railings:

Pipe handholds must be constructed from 1-1/2 inch I.D. Schedule 40, pipe. Pipe joints, if necessary must be minimized and must use a drive fit pipe sleeve at least eighteen inches long, and secured by plug welds. Attachment to uprights as noted. The pipe must be painted with recognized high quality paint.

Pipe handholds must be constructed from 1-1/2 inch E.D. Schedule 40 pipe.

- B. All components to be painted gloss black prior to installation with touchup in the field if necessary.
- C. Metal work shall be free of all extraneous markings, scars and abrasion. All edges shall be finished smooth to the touch. Welds shall be executed in accordance with the standards set

by the American Welding Society. Welds shall be ground smooth. Welding shall be completed in a manner so as not to add secondary stresses and created distortion.

### 2.3 INSTALLATION:

- A. Install equipment in accordance with the manufacturer's printed instructions and shop drawings, as indicated.
- B. Install system as square, plumb and true to adjacent work.
- C. All construction rubbish and spare materials will be removed by this contractor by project completion.

### 2.6 METAL SIGNAGE:

#### FABRICATION

#### A. Fabricate signage from:

- 1. Rectangular steel bars, angles, and other shapes: ASTM A36 or ASTM A1011 or ASTM A569.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. The Contractor shall examine areas and conditions under which the work under this Section is to be installed and shall notify the Owner's Representative in writing of conditions detrimental to proper and timely completion of work.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 ERECTION, INSTALLATION, APPLICATION

- A. Install equipment securely, complete with bolts, nuts, washers, clips, fittings, supports, and other items required for proper installation and operation.
- B. Position items accurately, true to plumb, line and level. Maintain maximum headroom and clearances at all points.
- C. Obtain Owner's Representative's prior approval for field welding. Carry out approved field welding in accordance with "Load and Resistance Factor Design" specifications by the AISC.
- E. Clean structural steel and fabricated steelwork of rust, scale and foreign matter by grinding; prime with 1 coat primer; finish with 1 coat first quality machinery enamel free of skips, runs and saps. Touch up field connections, welds and abraded places with primer and enamel.
- F. Install work in this Section in accordance with the Owner's Representative's direction, specifications, approved shop drawings, pertinent project drawings, established best trade practices and applicable code requirements.

3.3 ADJUSTING AND CLEANING

- A. Check, operate and adjust equipment and components, including spare equipment, for performance in accordance with specifications, approved shop drawings, project drawings, and industry standard practice, prior to Demonstration.
- B. Touch-up minor abrasions and imperfections as required.
- C. Superfluous equipment and materials supplied shall be removed from the area(s) of this work, removed from the job site and disposed of legally at no additional cost to the Owner.

3.4 METAL SIGNAGE - SHOP FABRICATION

- A. All required cutting, fitting and welding shall be performed in the manufacturers shop in accordance with the approved shop drawings and shall be in compliance with the NAAMM Metal Bar Grating Manual tolerances and welding standards.
- B. The finish coating, paint or galvanizing shall be applied after all of the required fabrication is complete. Steel, unless specified to be galvanized or unpainted, shall have all surfaces painted with one shop coat of manufacturer's standard paint, applied in accordance with the manufacturer's standard practice. One Shop coat of manufacturer's standard paint is design to protect the grating from the elements during transit.

3.5 METAL SIGNAGE INSTALLATION

- A. The signage structure shall be received at the job site by the contractor, unloaded and protected from damage prior to the requirement for it to be installed. Signage structure stored at the jobsite shall be covered or under a roof . Required covering is not the responsibility of the fabricator.
- B. Prior to structure installation, contractor shall inspect supports for correct size, layout and alignment. Any inconsistencies between contract drawings and supporting structure deemed detrimental to signage placement shall be reported in writing to the architect or owner's agent prior to placement. The installing contractor shall prepare the site for installation, determining that deviations from the approved drawings are corrected prior to signage placement.
- C. Preparation: Prior to signage fabrication, field verify required dimensions.
- D. Signage structure shall be installed in accordance with the manufacturer's recommendations, and approved shop drawings.
- E. Attach signage structure with prescribed hardware as described in the design documents.
- F. After installation, touch-up damaged finish with paint supplied by manufacturer and matching original coating.

END OF SECTION